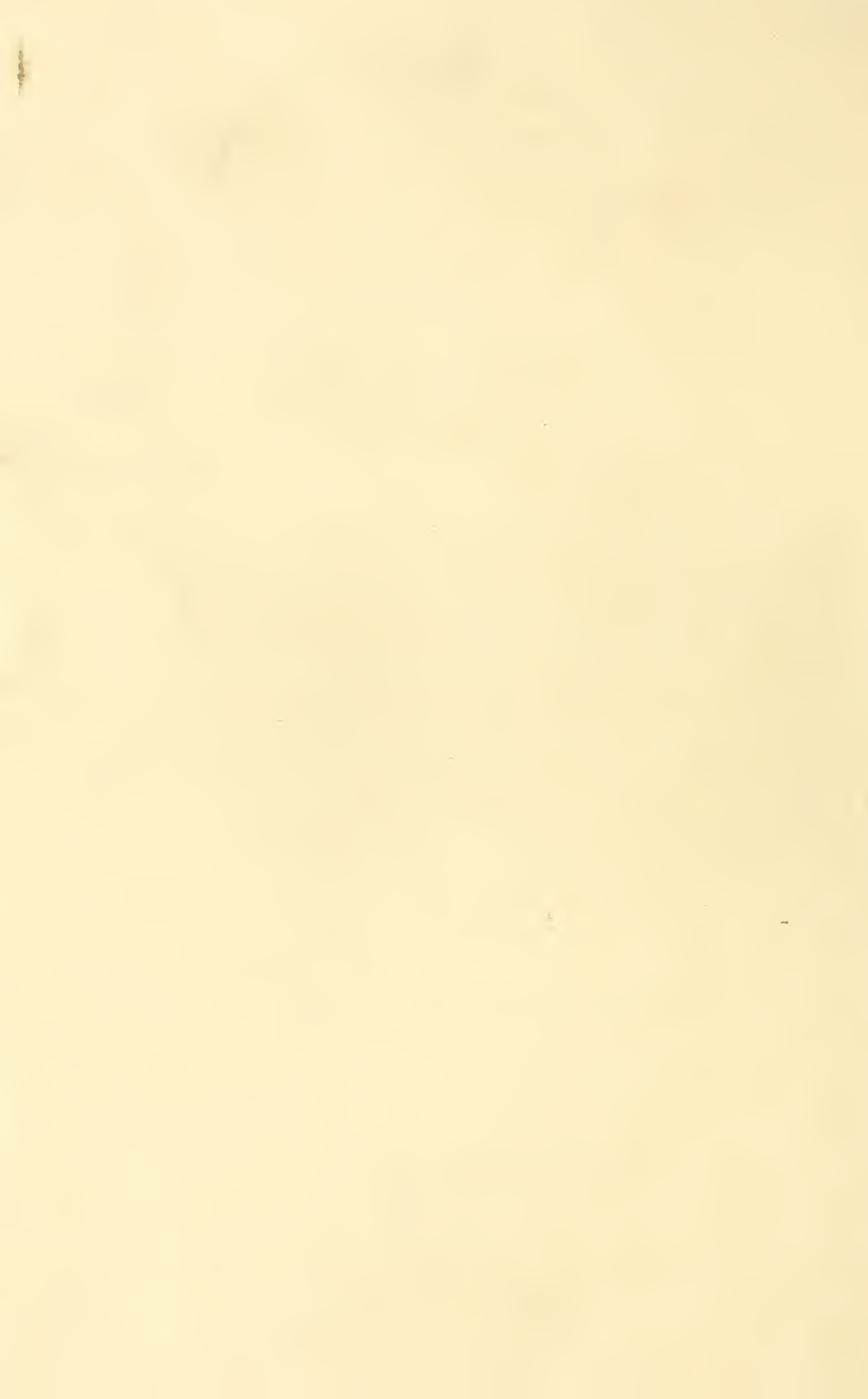


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# United States Department of Agriculture,

## DIVISION OF PUBLICATIONS—CIRCULAR NO. 1.

[Revised to January 1, 1907.]

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### ORGANIZATION OF DEPARTMENT OF AGRICULTURE, 1907.

The following statement has been brought up to January 1, 1907. It shows the organization of the several branches of the Department as furnished by the Chiefs of Bureaus, Divisions, and Offices.

GEO. WM. HILL, *Editor.*

Approved :

JAMES WILSON.

*Secretary of Agriculture.*

WASHINGTON, D. C., *December 28, 1906.*

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### OFFICE OF THE SECRETARY.

*Secretary of Agriculture, JAMES WILSON.*

The Secretary exercises personal supervision of public business relating to the agricultural industry. He appoints all the officers and employees of the Department with the exception of the Assistant Secretary and the Chief of the Weather Bureau, who are appointed by the President, and directs the management of all the Bureaus, Divisions, and Offices embraced in the Department. He exercises advisory supervision over agricultural experiment stations which receive aid from the National Treasury, has control of the quarantine stations for imported cattle, of interstate quarantine rendered necessary by sheep and cattle diseases, and of the inspection of cattle-carrying vessels, and directs the inspection of domestic and imported food products, under the meat inspection and pure-food laws. He is charged with the duty of issuing rules and regulations for the protection, maintenance, and care of the National forest reserves. He also is charged with carrying into effect the laws prohibiting the transportation by interstate commerce of game killed in violation of local laws and excluding from importation certain noxious animals, and has authority to control the importation of other animals.

The law establishing the Department, approved May 15, 1862, outlines the most important features of the work in the following provisions:

\* \* \* the general design and duties of which [the Department of Agriculture] shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of that word, and to procure, propagate, and distribute among the people new and valuable seeds and plants. \* \* \*

\* \* \* to acquire and preserve in his Department all information concerning agriculture which he can obtain by means of books and correspondence and

by practical and scientific experiments (accurate records of which experiments shall be kept in his office), by the collection of statistics, and by any other appropriate means within his power; to collect, as he may be able, new and valuable seeds and plants; to test by cultivation the value of such of them as may require such tests; to propagate such as may be worthy of propagation, and to distribute them among agriculturists. He shall annually make a general report in writing of his acts to the President and to Congress, in which he may recommend the publication of papers forming parts of or accompanying his report, which report shall also contain an account of all moneys received and expended by him. He shall also make special reports on particular subjects whenever required to do so by the President or either House of Congress, or when he shall think the subject in his charge requires it.

*Assistant Secretary of Agriculture, WILLET M. HAYS.*

The Assistant Secretary of Agriculture performs such duties as may be required by law or prescribed by the Secretary. He also becomes the Acting Secretary of Agriculture in the absence of the Secretary.

*Committee on New Buildings for the Department of Agriculture.*

A committee, of which B. T. Galloway, Chief of the Bureau of Plant Industry, is chairman, is charged with the general supervision of the erection of the new Department buildings now under construction, which were authorized by the act of Congress approved February 9, 1903. It makes all necessary recommendations, requests for authorizations, requisitions, etc., approves accounts, and attends to all the details connected with the work. In addition to the chairman, the members of the committee are A. C. True, Director of the Office of Experiment Stations, and Gifford Pinchot, Forester, and its meetings are attended in an advisory capacity by Capt. John S. Sewell, Engineer Corps, U. S. Army. The construction work is under the general direction of Captain Sewell, assisted by R. Barnard Talcott as consulting engineer, and S. Franklin Gardner, mechanical engineer and superintendent.

*Advisory Committee on Printing and Publication Work.*

In accordance with the Executive order of January 20, 1906, the Secretary, on January 23, 1906, appointed an Advisory Committee on Printing and Publication Work as follows: W. M. Hays, Assistant Secretary, chairman; Willis L. Moore, Chief of the Weather Bureau; and Geo. Wm. Hill, Department Editor, secretary. The duties of the committee are to assist in carrying out the directions of the order under which it was appointed. There are no stated times for holding meetings, the committee being called together whenever its advice is deemed necessary.

*Chief Clerk, S. R. BURCH.*

The Chief Clerk has the general supervision of the clerks and employees; of the order of business, and of the records and correspondence of the Secretary's office; of all expenditures from appropriations for contingent expenses, stationery, etc.; he is responsible for the enforcement of the general regulations of the Department and is custodian of the buildings occupied by the Department of Agriculture.

*Appointment Clerk, JOSEPH B. BENNETT.*

The Appointment Clerk is charged by the Secretary with the decision of all questions affecting appointments, transfers, promotions, reductions, details, furloughs, and removals in their relation to the Civil Service regulations, and with the preparation of all papers necessitated thereby. He has charge of all correspondence of the Department with the United States Civil Service Commission, and of all certificates and communications issued by that Commission to the classified service. He is the recorder and custodian of the oaths of office and personal reports of all persons appointed in the Department, and of all reports of the several Chiefs of Bureaus, Divisions, and Offices respecting the efficiency of the several clerks and employees under their respective supervision in the Department. He has the custody and use of the Department seal.

*Solicitor, GEO. P. McCABE.*

The Solicitor acts as the legal adviser of the Secretary, and is charged with the preparation and supervision of all legal papers to which the Department is a party, and of all communications to the Department of Justice and to the various officers thereof, including United States attorneys. He examines and approves, in advance of issue, all orders and regulations promulgated by the Secretary under statutory authority; represents the Department in all legal proceedings arising under the various laws intrusted to the Department for execution, and prosecutes applications of employees of the Department for patents.

*Chief of Supply Division, CYRUS B. LOWER.*

The Supply Division has charge of purchases of supplies and materials paid for from the general funds of the Department.

#### THE WEATHER BUREAU.

*Chief, WILLIS L. MOORE; Assistant Chief, HENRY E. WILLIAMS; Chief Clerk, DANIEL J. CARROLL.*

The Weather Bureau has charge of the forecasting of the weather; the issue of storm warnings; the display of weather, frost, cold wave, and flood signals for the benefit of agriculture, commerce, and navigation; the gaging and reporting of river stages; the maintenance and operation of U. S. Weather Bureau telegraph and telephone lines, and the collection and transmission of marine intelligence for the benefit of commerce and navigation; the reporting of temperature and rainfall conditions for the cotton, rice, sugar, and other interests; the distribution of meteorological information in the interests of agriculture and commerce, and the taking of such meteorological observations as may be necessary to establish and record the climatic conditions of the United States, or as are essential for the proper execution of the foregoing duties.

For the purpose of making its daily atmospheric survey the Weather Bureau maintains a Central Office in Washington and about 200 subordinate stations in various portions of the United States, including Alaska and Hawaii, and throughout the West Indies. In addition to these it receives, through the courtesy of the Governments concerned, daily telegraphic reports of observations made in Canada on the north, Mexico on the south, in the Azores and Iceland, along the western coast of Europe, and in European and Asiatic Russia, thus covering within its field of observation practically the whole of the inhabited



portions of the North American continent, and the North Atlantic Ocean, western and northern Europe and northern Asia.

The Assistant Chief, under the direction of the Chief of Bureau, has the supervision of matters pertaining to the personnel of stations, such as appointments, promotions, details, and assignments; of the distribution of the publications of the Bureau, and of such other matters as are not specifically assigned to the various divisions. In the absence of the Chief of Bureau he performs the duties of that official.

In addition to the duties imposed by the statutes on all chief clerks, the Chief Clerk of the Weather Bureau is especially charged with the care and preservation of the Weather Bureau buildings and grounds in Washington, D. C., the supervision of the duties of the captain of the watch and all employees under him; has direct charge of all mechanics and other employees not assigned to divisions; inspects and passes upon all requests for printing and binding; and is the custodian of all administrative papers, and papers and records relating to the personnel of the Bureau. In the absence of the Assistant Chief he performs the duties of that official.

#### THE FORECAST DIVISION.

EDWARD B. GARRIOTT, *in Charge*.

This Division receives and charts twice daily telegraphic reports of the prevailing weather conditions throughout the field of observation. From the observations thus charted the forecast official issues a statement of impending weather changes in all parts of the country, including the Great Lakes, the sea coasts, and the North Atlantic steamer route as far eastward as the Grand Banks. In the case of severe disturbances warnings are sent, not only to the regular Weather Bureau stations along the Lakes and seacoast, but also to about 255 special storm-warning stations at the lesser ports and at exposed points visible from the fairway of vessels. The forecast official also issues warning of approaching cold waves and heavy snows in the winter season, of frost in the spring and fall months, special attention being given to the needs of truck farmers in the Gulf and South Atlantic States, the cranberry growers of Wisconsin, New Jersey, and Massachusetts, and the fruit growers of Florida and California. This Division has charge of the photographic work of the Bureau, an important part of which is the preparation of slides for illustrated lectures given by the Weather Bureau officials throughout the country. It also conducts special studies that apply to the problem of weather forecasting.

#### *The River and Flood Section.*

HARRY C. FRANKENFIELD, *in Charge*.

The river and flood section, a branch of the Forecast Division, is, as its name implies, concerned with the rivers of the United States. In times of average or low-water stages its business is to facilitate commerce by giving information as to future stages of water along the navigable rivers; its chief function, however, is the issuance of flood warnings in time of threatened danger to life and property along the rivers, whether navigable or otherwise. This section maintains 431 special river stations along the rivers of the country, in addition to 55 regular Weather Bureau stations where river observations are taken. There are also 108 special rainfall stations maintained in the various watersheds.

#### THE CLIMATOLOGICAL DIVISION.

JAMES BERRY, *Chief*.

The duties of this Division embrace the collection of records of daily observations of temperature, precipitation, and miscellaneous weather phenomena, and their publication in monthly reports of State and Territorial sections of the Climatological service; the collection, from several thousand cooperative observers and special correspondents, during the season of planting, cultivating, and harvesting, of weekly data as to the current weather conditions, which data are summarized and published in the National Weekly Weather Bulletin and in 44 Section Bulletins; the establishment and maintenance of cooperative meteor-

ological stations, of which there are more than 3,600; the supervision of the special services, consisting of the telegraphic collection of daily temperature and rainfall reports and their publication in bulletin form at district centers, for the benefit of the corn, wheat, cotton, sugar, rice, and fruit interests; the collection and publication weekly during the winter months of data showing the depth of snow on the ground and the thickness of ice in rivers and harbors; the establishment of stations for the display of weather flags and the general distribution of forecasts and special warnings of cold waves, frosts, and severe local storms by telegraph at Government expense, and the gratuitous dissemination of such information by telephone, railway, telegraph, and train service, regular mail service, and rural free delivery.

#### THE DIVISION OF METEOROLOGICAL RECORDS.

FRANK H. BIGELOW, *in Charge*.

This Division has charge of the meteorological records of the Bureau, which includes the examination of the various meteorological reports, daily, monthly, and annual, as to their accuracy; the preparation of letters of instruction relative to the correction of station records; and the transfer of the summaries of the weather conditions at the various stations by months, years, etc., to the permanent records of the Bureau.

In this Division are also prepared the tabular climatic data for the Annual Report of the Chief of Bureau, and the principal tables and charts of meteorological data for the Monthly Weather Review.

It is also charged with the computation of meteorological and climatic statistics as applied to the needs of individuals, corporations, city officials, and courts of law; also the furnishing of information to health seekers and others contemplating a change of location or occupation, to whom climate is a matter of primary importance in the selection of a place of residence.

A study is also being made of the problems of reducing the barometric pressure, temperature, vapor tension, and other observations in order to show their relations to the circulation of the atmosphere.

#### THE INSTRUMENT DIVISION.

CHARLES F. MARVIN, *in Charge*.

The Instrument Division is charged with the equipment, installation, and maintenance of all the instruments required and used at stations in the making of meteorological observations.

The instruments are purchased under detailed specifications emanating from the Division, and before issue to stations are thoroughly tested and adjusted so that their errors become known and their indications are made certain and reliable.

All station officials are directed and instructed in detail in regard to the exposure and installation of instruments, in order to take due account of local conditions.

Finally the record sheets, from the automatic instruments especially, as made at stations, are critically inspected to ascertain not only whether the instruments are rendering proper service, but as well to determine whether the observers fully understand and care for their maintenance and proper operation.

The Instrument Division is also charged with the engineering details in connection with the equipment of storm-warning stations with steel towers for the display of flags and electric and oil-burning lanterns.

#### THE DIVISION OF OCEAN METEOROLOGY.

JAMES PAGE, *in Charge*.

This Division charts and tabulates the daily Greenwich mean noon meteorological observations returned by observers at sea. The number of these cooperating marine observers is now upward of 2,200, embracing a large percentage of the merchant and naval service of every seafaring nationality. The daily charts constructed from these observations render possible the study of the

weather changes along the principal steamship and sailing routes, enabling mariners, with the assistance of their own observations, to anticipate these changes and to act with intelligence in avoiding foul winds, as well as those of dangerous violence, and in profiting by fair winds. The information derived from the tabulations is furnished to the United States Hydrographic Office, Navy Department, and by that Office published in the form of monthly Pilot Charts, showing the average monthly conditions prevailing over the several oceans.

This Division is also in charge of a wireless telegraphic weather service, by means of which mariners far out at sea will be warned of the approach of storms of dangerous violence. It is hoped to ultimately extend this service to the entire trans-Atlantic steamship route. The information derived will also be utilized in the daily forecast of weather ashore, especially on the Pacific slope.

Translation of foreign correspondence and of publications and manuscripts for consultation by officials of the Weather Bureau and for publication is done in this Division.

#### THE MONTHLY WEATHER REVIEW.

CLEVELAND ABBE, *Editor*.

The Monthly Weather Review contains text, charts, and statistical tables, illustrating the dominant weather conditions of each month; it also contains a brief statement of the forecasts of storms and floods, a climatological summary, special contributions relative to meteorology, and a list of recent papers bearing on the work of the Bureau.

#### THE TELEGRAPH DIVISION.

JESSE H. ROBINSON, *Chief*.

The Telegraph Division is charged with the arrangement and control of telegraph circuits; the maintenance and repair of U. S. Weather Bureau telegraph and telephone lines and submarine cables; also the auditing of all telegraph accounts.

#### THE LIBRARY.

HERBERT H. KIMBALL, *Librarian, in Charge*.

The library of the Weather Bureau contains about 25,000 volumes and 5,000 pamphlets. It includes standard works of reference and technical books on meteorology and allied sciences, for the use of Weather Bureau officials in Washington and elsewhere, and a very complete file of the publications of meteorological and climatological services in all parts of the world. Especial attention is paid to the collection and classification of climatological data from distant regions, constant demands for which are received from officials in the different bureaus of the Department as well as from the public through correspondence.

The Librarian also has supervision over the small collection of text and reference books allowed each local office of the Weather Bureau, and has charge of the examinations for promotion in the Weather Bureau.

#### THE PUBLICATIONS DIVISION.

JOHN P. CHURCH, *Chief*.

This Division is charged with the publication, issue, and distribution of daily weather maps, the Monthly Weather Review, and various charts and miscellaneous printed matter pertaining to the Weather Bureau.

#### THE DIVISION OF SUPPLIES.

FRANK M. CLEAVER, *Chief*.

This Division is charged with the purchase and issue of supplies and the safe-keeping of all public property belonging to the Weather Bureau.



## THE DIVISION OF ACCOUNTS.

EDGAR B. CALVERT, *in Charge*.

The Division of Accounts audits, adjusts, and prepares for payment all accounts and claims against the Weather Bureau; prepares advertisements, schedules, leases, and agreements; issues requests for passenger transportation; prepares the annual estimates of appropriations; transacts all business relating to the financial interests of the Weather Bureau, and supervises the construction of Weather Bureau buildings outside of Washington, including repairs thereto.

## MOUNT WEATHER METEOROLOGICAL RESEARCH OBSERVATORY.

(Mount Weather, near Bluemont, Va.)

WILLIAM J. HUMPHREYS, *in Charge*.

The purpose of this observatory is to carry on an extensive system of observations and experiments along the line of meteorological research. The work will include the exploration of the atmosphere to altitudes of 3 to 10 miles by means of kites and balloons; research in the allied subjects of solar radiation, atmospheric electricity, the ionization of gases, radio-activity, etc; the discussion of meteorological observations from the point of view of their relation to solar physics, and the selection of meteorological and magnetic elements and their comparison with solar observations. The atmosphere of the sun and that of the earth, together with the connecting radiations, will be studied as one branch of science having common interests, which may be designated as cosmical meteorology. In these buildings the Weather Bureau will have the most approved apparatus for measuring atmospheric electricity and magnetism, for measuring solar radiation in the spectrum, for registering the sun-spot areas, the prominence output, and the extent of the faculae. Assistants in this work are: Oliver L. Fassig, Herbert H. Kimball, Cleveland Abbe, jr., William R. Blair, Eric R. Miller, Charles S. Wood, and Harvey H. Spindler.

## WEATHER BUREAU STATIONS AND WORK OUTSIDE OF WASHINGTON, D. C.

In the performance of the duties imposed upon it by the organic act the Weather Bureau maintains throughout the United States, in the West Indies, and in Hawaii 200 meteorological stations, employing from one to ten men each. At these stations regular meteorological observations are taken and telegraphed, meteorological data recorded and tabulated, and the forms and publications necessary to the effective distribution of the forecasts, warnings, and climatological data prepared and issued.

For forecast purposes the United States is divided into districts comprising: (1) The Upper Mississippi Valley and the Northwest, Henry J. Cox, Chicago, Ill., in charge. (2) The New England States, John W. Smith, Boston, Mass., in charge. (3) Kentucky and Tennessee, Ferdinand J. Walz, Louisville, Ky., in charge. (4) Louisiana, Texas, Arkansas, Oklahoma, and Indian Territory, Isaac M. Cline, New Orleans, La., in charge. (5) Wyoming, Utah, Colorado, New Mexico, and Arizona, Frederick H. Brandenburg, Denver, Colo., in charge. (6) New York City, Eben H. Emery, in charge. (7) California and Nevada, Alexander G. McAdie, San Francisco, Cal., in charge. (8) Washington, Oregon, and Idaho, Edward A. Beals, Portland, Oreg., in charge. (9) The remainder of the United States, Edward B. Garriott, Washington, D. C., in charge. At the first six of the stations named morning forecasts only are prepared and distributed; at the last three both morning and evening forecasts.

For purposes of inspection the United States is divided into two inspection districts, designated, respectively, the Eastern District, which includes the region to the east of the Mississippi River and all Weather Bureau stations on that river, and the Western District, comprising the remainder of the United States. The inspectors of the Weather Bureau are Norman B. Conger and Henry B. Hersey, with headquarters at Detroit, Mich., and Milwaukee, Wis., respectively.

For the collection, publication, and distribution of climatological data and information relating to current weather conditions, the United States, including Porto Rico and Hawaii, is divided into 44 local sections, which, with the names of the officials in charge, are as follows:

Alabama, Montrose W. Hayes, Montgomery.	New England, John W. Smith, Boston, Mass.
Arizona, Lewis N. Jesunofsky, Phoenix.	New Jersey, Levi A. Judkins, Atlantic City.
Arkansas, Henry F. Alciatore, Little Rock.	New Mexico, Charles E. Linney, Santa Fe.
California, Alexander G. McAdie, San Francisco.	New York, Wilford M. Wilson, Ithaca.
Colorado, Frederick H. Brandenburg, Denver.	North Carolina, Alfred H. Thiessen, Raleigh.
Florida, Alexander J. Mitchell, Jacksonville.	North Dakota, Orris W. Roberts, Bismarck.
Georgia, John B. Marbury, Atlanta.	Ohio, J. Warren Smith, Columbus.
Hawaii, William B. Stockman, Honolulu.	Oklahoma, J. Pemberton Slaughter, Oklahoma.
Idaho, Edward L. Wells, Boise.	Oregon, Edward A. Beals, Portland.
Illinois, William G. Burns, Springfield.	Pennsylvania, Theodore F. Townsend, Philadelphia.
Indiana, William T. Blythe, Indianapolis.	Porto Rico, Albert L. Brockway, San Juan.
Iowa, George M. Chappel, Des Moines.	South Carolina, Jacob W. Bauer, Columbia.
Kansas, Thorp P. Jennings, Topeka.	South Dakota, Samuel W. Glenn, Huron.
Kentucky, Ferdinand J. Walz, Louisville.	Tennessee, Henry C. Bate, Nashville.
Louisiana, Isaac M. Cline, New Orleans.	Texas, Bernard Bunnemeyer, Galveston.
Maryland, Charles F. von Herrmann, Baltimore.	Utah, Robert J. Hyatt, Salt Lake City.
Michigan, Charles F. Schneider, Grand Rapids.	Virginia, Edward A. Evans, Richmond.
Minnesota, Ulysses G. Russell, Minneapolis.	Washington, George N. Sallsbury, Seattle.
Mississippi, William S. Belden, Vicksburg.	West Virginia, Henry C. Howe, Parkersburg.
Missouri, George Reeder, Columbia.	Wisconsin, Henry B. Hersey, Milwaukee.
Montana, R. Frank Young, Helena.	Wyoming, Walter S. Palmer, Cheyenne.
Nebraska, George A. Loveland, Lincoln.	
Nevada, Henry F. Alps, Reno.	

#### BUREAU OF ANIMAL INDUSTRY.

*Chief*, A. D. MELVIN; *Assistant Chief*, A. M. FARRINGTON; *Chief Clerk*, E. B. JONES.

The Bureau of Animal Industry has charge of the work of the Department relating to the live-stock industry. In general it deals with the investigation, control, and eradication of diseases of animals, the inspection and quarantine of live stock, and the inspection of meat and meat food products, and with animal husbandry and dairying.

The Bureau conducts the inspection of live stock, meats, and meat food products intended for interstate or foreign commerce, under the act of Congress of June 30, 1906; and also has charge of the inspection of import and export animals, the inspection of ships for the transportation of export animals, and the quarantine stations for imported animals. It investigates the existence of communicable diseases of live stock; makes original scientific investigations as to the nature, cause, and prevention of such diseases; and takes measures for their repression and eradication, frequently in cooperation with State and Territorial authorities. As part of this work, a quarantine of the section infected with Texas or southern fever of cattle is maintained; the extermination of the tick which transmits this disease has recently been undertaken; and sheep scab and cattle mange are being eradicated from the West. The Bureau makes investigations in the breeding and feeding of animals and in regard to dairy subjects; it inspects and certifies dairy products for export, and supervises the manufacture and interstate commerce of renovated butter. Reports of scientific investigations and treatises on various subjects relating to the live-stock industry are prepared and published.

#### THE INSPECTION DIVISION.

RICE P. STEDDOM, *Chief*; U. G. HOUCK, *Associate Chief*; MORRIS WOODEN, *Assistant Chief*.

The work of the Inspection Division consists of two main lines—the meat inspection and the field work for the control and eradication of contagious diseases.

The meat inspection includes the ante-mortem and the post-mortem inspection of cattle, sheep, swine, and goats slaughtered at establishments engaged in interstate or foreign commerce; the supervision of such establishments and of the

various processes of preparing, curing, canning, packing, etc., so as to insure sanitary conditions, equipment, and methods; the condemnation and proper disposal of carcasses and products found to be diseased, unwholesome, or otherwise unfit for human food; the labeling and certification of meats and products that have been inspected and passed; the microscopic inspection of pork for export to countries requiring such inspection; and the regulation and supervision of the interstate transportation and exportation of meats and meat food products. The meat inspection is now carried on at 595 establishments in 142 cities.

The field work consists of the inspection of live stock at points of origin, in transit, and at market centers; the disinfection of cars; and the supervision and enforcement of other measures to prevent the spread of contagious diseases through the channels of interstate commerce, and to stamp out such diseases. This includes the inspection of southern cattle and the supervision of their movement when forwarded from the area quarantined on account of Texas or southern cattle fever; also the inspection and, when necessary, the dipping of sheep and cattle to eradicate and prevent the spread of scabies. As a result of the latter work, in cooperation with State and Territorial authorities, sheep scab and cattle mange have been wiped out from large areas in the West where they were formerly prevalent, and efforts are being directed toward the ultimate complete eradication of these diseases from the United States.

The Inspection Division also has charge of the inspection of domesticated animals for importation from Mexico and the work for the extermination of the southern cattle tick.

#### THE DAIRY DIVISION.

ED. H. WEBSTER, *Chief*; CLARENCE B. LANE, *Assistant Chief*.

The work of this Division is "to collect and disseminate information concerning dairy farming, the care and improvement of dairy cattle, and the production, care, and distribution of dairy products." It maintains a general survey of the condition of the dairy industry in the country at large and in the different sections, in addition to special inquiries as to dairy organizations, dairy schools, and facilities for technical instruction, State dairy laws, the development of markets, the milk supply of cities and towns, and the laws and regulations in reference thereto.

The Division also makes investigations as to the manufacture of butter and cheese, including European varieties of cheese, and concerning dairy machinery and equipment. The Division architect prepares plans and technical advice for the construction of sanitary and economical dairy buildings. The organization and management of creameries and factories and of the larger dairy enterprises, now increasing in number and importance, are receiving special attention. The Division is also charged with the details of administration of the laws concerning the inspection of factories and markets for "renovated butter" and of dairy products for export.

Reports upon all these lines of work are prepared and published, and an extensive correspondence is conducted to ascertain and meet the needs of those interested in the various departments of the dairy industry. The Division seeks to serve as a clearing house for dairy experience and information. Its officers and agents visit the dairy centers and conventions for personal contact and advice.

The work of the Dairy Division is subdivided as follows: Market milk investigations, in charge of the Assistant Chief; butter investigations, in charge of C. E. Gray; cheese investigations, in charge of C. F. Doane; southern dairy investigations, in charge of B. H. Rawl; building and management investigations, in charge of B. D. White; dairy laboratories, in charge of L. A. Rogers; inspection of renovated butter factories, in charge of M. W. Lang; inspection of renovated butter markets, in charge of Levi Wells.

#### THE QUARANTINE DIVISION.

RICHARD W. HICKMAN, *Chief*.

The inspection and quarantine of imported animals with a view to excluding contagion, the management of the animal quarantine stations, and the inspection of live stock for export come under this Division. The ships carrying exported animals are also inspected, and regulations as to fittings, equipment, ventilation, feed, water, attendants, etc., are enforced.



## THE BIOCHEMIC DIVISION.

M. DORSET, *Chief*; JAMES A. EMERY, *Assistant Chief*.

This Division prepares tuberculin and mallein and furnishes these substances free of charge to health officers for use in official tests. It conducts experiments concerning immunity, with the object of obtaining vaccines and antitoxins for animal diseases; carries on researches concerning the causes of certain infectious diseases; makes chemical examinations of meats and meat food products in connection with the meat-inspection service; carries on experiments with dips and disinfectants; prepares records of tests and experiments; and prepares for publication from time to time reports of work which has been completed.

The scientific staff of the Division includes T. M. Price, chemist in charge of central meat-inspection laboratory; B. M. Bolton, bacteriologist assisting in hog-cholera investigations; C. N. McBryde, bacteriologist in charge of field bacteriological laboratory; W. B. Niles, inspector in charge of field experiments concerning hog cholera; and E. W. Brown, assistant chemist in charge of poultry digestion experiments.

## THE PATHOLOGICAL DIVISION.

JOHN R. MOHLER, *Chief*; HENRY J. WASHBURN, *Assistant Chief*.

The work of this Division is chiefly along the lines of pathological diseases of animals. It prepares and distributes blackleg vaccine and tabulates the results for publication; conducts scientific investigations of animal diseases; carries on experiments with immunizing agents for the purpose of protecting animals against diseases; cooperates with the State Agricultural Experiment Stations with the view to combating diseases peculiar to the localities; determines pathological specimens referred to the Division for diagnosis; prepares answers to numerous inquiries regarding diseases of animals. The Division also makes diagnoses and investigations relative to rabies in the District of Columbia. Reports are prepared and published upon the experimental work carried on.

The scientific staff of the Division includes J. S. Buckley, in charge of blackleg investigations; George Byron Morse, in charge of investigations concerning diseases of poultry and cold-blooded animals; George H. Hart, in charge of rabies and glanders investigations; Charles F. Flocken, in charge of cooperative experiments with the Minnesota Agricultural Experiment Station; Adolph Eichhorn, in charge of field investigations, and L. Enos Day, in charge of branch pathological laboratory at Chicago, Ill.

## THE DIVISION OF ZOOLOGY.

B. H. RANSOM, *Chief*.

This Division collects and describes animal parasites of all kinds; determines such parasites as are sent to the Bureau and conducts correspondence regarding them; keeps a card index of animal parasites and a bibliography of literature relating to them; investigates diseases of parasitic origin, and prepares and publishes reports on such investigations. Scientific assistants are Albert Hassall, Earle C. Stevenson, and H. W. Graybill.

## THE EXPERIMENT STATION.

E. C. SCHROEDER, *Superintendent*; W. E. COTTON, *Assistant*.

The Experiment Station of the Bureau is located at Bethesda, Md. It is equipped for and conducts investigations regarding animal diseases with a view to their control and eradication and their bearing on the public health, and investigations in animal breeding with special reference to the laws of heredity, the production of useful hybrids, and the development of increased resistance to disease. A small farm is maintained in such a manner as to provide the other divisions of the Bureau with facilities for making observations for which large domestic animals are needed.



The work of the station consists of independent original investigations and investigations in cooperation with and supplemental to those of the other divisions. Reports of the results obtained are written for publication.

#### THE ANIMAL HUSBANDRY OFFICE.

GEORGE M. ROMMEL, *Animal Husbandman*; G. ARTHUR BELL, *Assistant Animal Husbandman*.

This office gathers information and makes studies and experiments concerning the breeding and feeding of farm animals and poultry; supervises pedigree record associations under paragraph 473 of the tariff act of July 24, 1897 (amended March 3, 1903), and attends to correspondence and prepares publications on these subjects. The office is now engaged in experiments in regard to the harmful properties of cotton seed and cotton-seed products when fed to hogs; experiments in breeding small animals; experiments to test the relative value of different systems of feeding poultry, and a study of the inheritance of fecundity in hogs. Cooperative work with State experiment stations comprises investigations in animal nutrition at the Pennsylvania Station, in beef production in Alabama, in horse breeding in Colorado and Vermont, in sheep breeding in Wyoming, in poultry breeding and management in Maine, in turkey breeding in Rhode Island, and in zebra-hybrid breeding in Maryland. The staff of this office includes George R. Samson, herd book assistant; Rob R. Slocum, poultry assistant; L. R. Davies, scientific assistant in hog investigations, and E. H. Riley, scientific assistant in animal-breeding investigations.

#### THE EDITORIAL OFFICE.

JAMES M. PICKENS, *Editor*.

The work of this office comprises the editing and proof reading of all the publications of the Bureau, the indexing of such as require it, the compilation of the annual report, and the preparation of special articles and other material for publication. This office also makes translations, compiles information, and attends to correspondence relating to the Bureau's publications and miscellaneous subjects.

#### BUREAU OF PLANT INDUSTRY.

*Pathologist and Physiologist, and Chief of Bureau*, BEVERLY T. GALLOWAY; *Pathologist and Physiologist, and Assistant Chief of Bureau*, ALBERT F. WOODS; *Editor*, J. E. ROCKWELL; *Chief Clerk*, JAMES E. JONES; *Assistant in Charge of Records*, LEON M. ESTABROOK.

The Bureau of Plant Industry studies plant life in all its relations to agriculture. The scientific work of the Bureau is divided into 25 distinct groups corresponding to the divisions of other bureaus. A brief statement of the special work and organization of each group follows.

#### LABORATORY OF PLANT PATHOLOGY.

• ERWIN F. SMITH, *Pathologist in Charge*.

This laboratory conducts technical investigations of plant diseases. The general technical work of the laboratory is conducted under Doctor Smith's direction by Haven Metcalf, Pathologist, and John R. Johnston and Florence Hedges, Scientific Assistants. Work on cotton and truck crop diseases is conducted by William A. Orton, Pathologist, with the assistance of William W. Gilbert, Scientific Assistant. The pathological collections are under the charge of Flora W. Patterson, Mycologist, and Vera K. Charles, Scientific Assistant.

#### INVESTIGATIONS OF DISEASES OF FRUITS.

MERTON B. WAITE, *Pathologist in Charge*.

The work of this office is devoted especially to the study of the diseases of all fruits and the methods of controlling them. The work on diseases of orchard fruits is conducted under Mr. Waite's personal direction by Patrick J. O'Gara,

Scientific Assistant; W. S. Ballard, Special Agent; F. W. Faurot, Special Agent. The diseases of grapes and small fruits are studied by Cornelius L. Shear, Pathologist, assisted by George F. Miles, Scientific Assistant, and Anna K. Wood, Botanical Assistant. The spraying demonstration work is conducted by W. M. Scott, Pathologist, with the assistance of James B. Rorer, Scientific Assistant.

#### PLANT BREEDING INVESTIGATIONS.

The work of this office is the investigation of all matters relating to the improvement of plants by breeding and selection. It is conducted by the following men: T. H. Kearney, Physiologist in charge of alkali and arid region plant breeding, assisted by L. L. Harter, Scientific Assistant; A. D. Shamel, Physiologist in charge of tobacco breeding, assisted by W. W. Cobey, Expert, and W. W. Garner, Scientific Assistant; C. P. Hartley, Physiologist in charge of corn breeding; D. A. Saunders and D. N. Shoemaker, Special Agents in charge of cotton breeding, Waco, Texas; R. L. Bennett, Special Agent in charge of cooperative breeding work in Texas; S. M. Bain, Special Agent in charge of cooperative work in Tennessee, assisted by E. B. Boykin, Special Field Agent; J. B. Norton, Assistant Physiologist in charge of oat and potato breeding.

#### PLANT LIFE HISTORY INVESTIGATIONS.

WALTER T. SWINGLE, *Physiologist in Charge.*

This office studies the special relation and adaptation of plants to climatic and soil conditions. The work is directed by Mr. Swingle with the assistance of Charles J. Brand, Assistant Physiologist.

#### SOIL BACTERIOLOGY AND WATER PURIFICATION INVESTIGATIONS.

KARL F. KELLERMAN, *Physiologist in Charge.*

This office investigates the relation of bacteria to soil fertility and plant growth, nitrogen fixation, etc. It studies organisms contaminating water supplies and the methods of destroying the contaminating forms. The work is conducted under Mr. Kellerman's direction by T. R. Robinson, Assistant Physiologist, and T. D. Beckwith, Assistant Physiologist.

#### BIONOMIC INVESTIGATIONS OF TROPICAL AND SUBTROPICAL PLANTS.

O. F. COOK, *Bionomist in Charge.*

These investigations are a continuation of the studies in tropical agriculture, but the scope of the work has been enlarged so as to provide for a bionomic treatment of the numerous temperate and subtropical crop plants which were originally natives of tropical countries, such as Indian corn, cotton, beans, potatoes, tomatoes, etc. Experiments are being conducted with weevil-resistant Central American varieties of cotton, and with varieties of corn adapted to special conditions of growth, as in the humid Tropics or in arid regions. Coffee, rubber, and cacao are the tropical products receiving principal attention. Assisting in the work are G. N. Collins, Assistant Botanist; H. Pittier, Special Agent; F. L. Lewton, Scientific Assistant; J. H. Kinsler, Argyle McLachlan, and George P. Goll, Special Agents; Conrad B. Doyle, Expert.

#### DRUG AND POISONOUS PLANT INVESTIGATIONS AND TEA CULTURE INVESTIGATIONS.

RODNEY H. TRUE, *Physiologist in Charge.*

This branch of the Bureau has for its object the study of problems along three lines, as follows: (1) Drug-Plant Investigations, dealing with the growing, curing, and handling of drug-plant products for the purpose of learning to what extent this country can supply its own demand for drug products of vegetable origin. The field work is carried on at Burlington, Vt., in cooperation with the Vermont Agricultural Experiment Station; at Ebenezer, S. C., and in the laboratories at Washington, D. C. (2) Tea-Culture Investigations, undertaken

to ascertain whether it is possible and practicable to produce tea commercially in this country. Experiments are conducted in tea culture, and methods of growing, curing, and handling the tea are being worked out. The work is carried on at Summerville, S. C., under Dr. Charles U. Shepard, Special Agent; at Pierce, Tex., under F. W. Clarke, Special Agent, and in the laboratories at Washington, D. C. (3) Poisonous-Plant Investigations, having for their object ascertaining the relations existing between poisonous plants and losses of stock in various parts of the country, especially in the grazing regions of the West. Means of preventing such losses are sought. The work consists of field experiments carried on at Hugo, Colo., in cooperation with the Colorado Agricultural Experiment Station; at Bozeman, Mont., in cooperation with the Montana Station; and at Reno, Nev., in cooperation with the Nevada Station at that point.

Those assisting in the work, with headquarters at Washington, D. C., are W. W. Stockberger and C. D. Marsh, Experts; A. C. Crawford, Pharmacologist, and Alice Henkel, Assistant in Drug-Plant Investigations.

#### PHYSICAL LABORATORY.

LYMAN J. BRIGGS, *Physicist in Charge.*

This laboratory determines the influence of the various methods of soil preparation and crop rotation upon the moisture, temperature, humus content, soluble-salt content, aeration, and other physical properties of the soil, and provides data for a comparison of the soil and climatic conditions in the arid and semiarid regions of the Great Plains area. This work is in close cooperation with the investigations of dry-land agriculture, in charge of E. C. Chilcott.

#### TAXONOMIC INVESTIGATIONS.

FREDERICK V. COVILLE, *Botanist in Charge.*

This office maintains the economic herbarium, including the collections of useful native plants, weeds, cultivated plants, and grasses; investigates the fiber plants of the United States; and is engaged in various other botanical investigations, including the preparation of a manual of the grasses of the United States, a flora of Alaska, and reports on the native plant resources of the country. The office includes Lyster H. Dewey, Botanist in Charge of Fiber-Plant Investigations; A. S. Hitchcock, Systematic Agrostologist in Charge of Botanical Studies of Grasses; W. F. Wight, Botanist in Charge of Economic Herbarium; W. E. Safford, Botanist, engaged in the preparation of reports on economic plants; P. L. Ricker, Scientific Assistant, engaged in botanical study of grasses; Fred J. Tyler, Scientific Assistant, identification and classification of species and varieties of cotton; Agnes Chase, identification and classification of grasses.

#### FARM MANAGEMENT INVESTIGATIONS.

WILLIAM J. SPILLMAN, *Agriculturist in Charge.*

The Office of Farm Management studies the details of farm practice. Its main object is to improve farm practice by introducing better business methods and applying the principles of science wherever they are known. It investigates types of farming that prevail in different sections of the country and the results that are secured from each type; studies crop rotations, methods of tillage, and the details of crop management, and pays particular attention to methods used by farmers for building up and maintaining the fertility of their soil. It also conducts object-lesson farms for the purpose of demonstrating the value of improved methods; studies systems of management on the ranges of the West, and is investigating the use and value of the cactus as a forage plant. The office includes: D. A. Brodie, Assistant Agriculturist in charge of Farm Management Districts; David Griffiths, Assistant Agriculturist in charge of Range and Cactus Investigations; C. B. Smith, Assistant Agriculturist in charge of Investigations of Farm Practice; W. A. Peck, Assistant Agriculturist in charge of Investigations Relating to the Application of Business System to Farming; H. Benton, M. A. Crosby, C. K. McClelland, C. W. Warburton, L. G. Dodge, Byron Hunter, J. A. Warren, and Lyman Carrier, Assistant Agriculturists in charge of farm management districts; J. S. Cates, H. B. McClure,



S. M. Tracy, C. E. Quinn, J. S. Cotten, J. A. Drake, and F. G. Allison, Assistant Agriculturists in charge of investigations relating to various phases of farm practice.

#### GRAIN INVESTIGATIONS.

MARK A. CARLETON, *Cercalist in Charge.*

This work has to do with the production and handling of all cereals and cereal products. The investigations are conducted, under Mr. Carleton's direction, by J. S. Chamberlain, Physiological Chemist; J. A. Le Clerc, Physiological Chemist; E. M. Freeman, Pathologist; C. R. Ball, Agrostologist; and V. L. Cory, H. F. Blanchard, H. B. Derr, H. E. Ney, and H. J. C. Umberger, Scientific Assistants.

#### ARLINGTON EXPERIMENTAL FARM.

LEE C. CORBETT, *Horticulturist in Charge.*

The Arlington Farm is the field laboratory at Washington for the Bureau of Plant Industry. Each office of the Bureau carrying on field investigations from the city laboratories maintains experiment plats at the farm. At present the lines of work include truck-work investigations, nursery experiments, forage-plant experiments, pathological and physiological investigations, and cultural and variety tests with fruit. Assisting in this work are W. R. Beattie and E. C. Butterfield, Assistant Horticulturists; E. J. Glasson and W. W. Smith, Experts.

#### SUGAR-BEET INVESTIGATIONS.

C. O. TOWNSEND, *Pathologist in Charge.*

These investigations include experiments in cultural methods and the use of fertilizers for the production of sugar beets having a high sugar content and purity coefficient; the production of a single-germ beet seed; and the control of diseases affecting this crop. The work is carried on, under Doctor Townsend's direction, by E. C. Rittue, Field Assistant, and Nellie A. Brown, Scientific Assistant.

#### WESTERN AGRICULTURAL EXTENSION.

CARL S. SCOFIELD, *Agriculturist in Charge.*

This work, which is so far in a tentative state, has for its object a general survey and study of conditions in the West, where large irrigation projects are under way. Important questions pertaining to crop production will naturally come up in connection with these projects, and the present work is in the nature of a preliminary investigation for the development of plans for future action. Those assisting in the work are F. B. Headley, Assistant in Agronomy, stationed at San Antonio, Tex.; W. A. Peterson, Special Agent, Yuma, Ariz.

#### DRY LAND AGRICULTURE.

E. CHANNING CHILCOTT, *Agriculturist in Charge.*

The object of this work is to determine the best method of soil preparation and crop rotation for the conservation of the moisture and the maintenance of the humus in the soil in the semiarid regions of our Great Plains area. Assisting in this work are A. H. Leidigh, Superintendent in Charge of the Station at Amarillo, Tex.; O. H. Elling, Superintendent in Charge of the Station at Hays City, Kans.; W. P. Snyder, Superintendent in Charge of the Station at North Platte, Nebr.; Sylvester Balz, Superintendent in Charge of the Station at Highmore, S. Dak.; O. A. Thompson, Superintendent in Charge of the Station at Edgely, N. Dak.; L. R. Waldron, Superintendent in Charge of the Station at Dickinson, N. Dak., and J. E. Payne, Superintendent in Charge of the Station at Garden City, Kans.; L. E. Hazen, E. F. Chilcott, W. W. Burr, and F. L. Kennard, Special Agents, stationed at various points in the Great Plains area.



## POMOLOGICAL COLLECTIONS.

GUSTAVUS B. BRACKETT, *Pomologist in Charge.*

This branch of the Bureau collects and distributes information in regard to the fruit interests of the United States; determines the identity and estimates the value of fruits submitted for examination; is engaged in the simplification and purification of fruit nomenclature; and maintains a pomological herbarium. The Pomologist in Charge is assisted by W. H. Ragan, Expert in Pomological Nomenclature.

## FIELD INVESTIGATIONS IN POMOLOGY.

WILLIAM A. TAYLOR AND G. HAROLD POWELL, *Pomologists in Charge.*

This office investigates the habits and peculiar qualities of fruits; their adaptability to various soils and climates, and conditions of culture. It studies the methods of harvesting, handling, and storing fruits with a view to improving our own markets and extending them into foreign countries. The principal assistants in this work are H. P. Gould, Assistant Pomologist in Charge of Fruit District Investigations; George C. Husmann, Pomologist in Charge of Viti-cultural Investigations; L. S. Tenny, Pomologist and Pathologist in Charge of Fruit Storage Investigations.

## EXPERIMENTAL GARDENS AND GROUNDS.

EDWARD M. BYRNES, *Superintendent.*

This branch is charged with the care and ornamentation of the parks surrounding the Department buildings; with the duties connected with the conservatories and gardens; and with the testing and propagation of economic plants. It carries on investigations for the purpose of determining the best methods of improving the culture of plants under glass, and other lines of investigation connected with intensive horticulture.

## SEED AND PLANT INTRODUCTION AND DISTRIBUTION.

This line of work is divided into several offices, which handle all work relating to the purchase and distribution of valuable seeds and plants, including those allotted by law to Senators, Representatives, and Delegates in Congress; also those secured for experimental work conducted in cooperation with the agricultural experiment stations and private experimenters in various parts of the country. The officers are David G. Fairchild, Agricultural Explorer, in Charge of Seed and Plant Introduction; W. W. Tracy, sr., Superintendent of Testing Gardens; C. V. Piper, Agrostologist, in Charge of Forage Crop Investigations; Lisle Morrison, Assistant, in Charge of Congressional Seed Distribution; J. E. W. Tracy, Assistant Superintendent of Testing Gardens; George W. Oliver, Expert Plant Propagator; J. M. Westgate, Assistant Agrostologist; W. W. Tracy, jr., Assistant Botanist; Frank N. Meyer, Agricultural Explorer; Charles F. Wheeler, Expert Consulting Botanist; A. B. Conner, Special Agent in Charge of Forage Crops for Northwestern Texas; John H. Tull, Special Agent in Charge of Matting-Rush Investigations; Harold T. Nielson, Scientific Assistant.

## SEED LABORATORY.

EDGAR BROWN, *Botanist in Charge.*

The object of the work of the Seed Laboratory is to improve the quality of agricultural seeds. Samples submitted by farmers and others are tested for mechanical purity and germination. Public announcements are made of prevalent adulterations and general conditions of poor quality existing in the seed trade. The proper conditions for storage under varying climatic conditions are being worked out. The deterioration of grain in transit is being studied with a view to improving the present conditions. In cooperation with other offices of the Bureau, clover and alfalfa seed is being produced which is adapted to particular localities. Assisting in the work are Joseph W. T. Duvel, Assistant in Charge of Seed Vitality Investigations; F. H. Hillman, Assistant Botanist in Charge of Seed Studies; W. L. Goss, Scientific Assistant.

## GRAIN STANDARDIZATION.

JOHN D. SHANAHAN, *Expert in Charge.*

This work consists of a study of the present systems of grading grain and the determination of new and more exact methods. Under the general direction of John D. Shanahan, who has headquarters in Washington, are Leslie A. Fitz, Scientific Assistant in charge of the Baltimore laboratory, assisted by C. A. Neal; Clyde E. Leighty, Expert in charge of the New Orleans laboratory, assisted by W. P. Carroll; E. G. Boerner, Special Agent in charge of foreign investigations.

## MISSISSIPPI VALLEY LABORATORY.

HERMANN VON SCHRENK, *Expert in Charge.*

This laboratory, located at St. Louis, Mo., deals principally with the investigation of diseases of fruit and forest trees and the preservation of timber, and its work is carried on principally in the Mississippi Valley States, both independently and in cooperation with nurseries and lumber companies. Assisting in the work are George G. Hedgcock, Perley Spaulding, and Laura Eames, Scientific Assistants. After July 1, 1907, this work will be concentrated in Washington.

## SUBTROPICAL LABORATORY AND GARDEN.

ERNST A. BESSEY, *Pathologist in Charge.*

This laboratory is located at Miami, Fla., and its work consists of the investigation of diseases of citrus and other subtropical trees and fruits and of truck crops, the improvement of subtropical fruits, grapes, etc., and the study of nematode diseases of economic plants. Assisting in these investigations are George L. Fawcett, Scientific Assistant, and P. J. Wester, Special Agent.

## PLANT INTRODUCTION GARDEN.

PALEMON H. DORSETT, *Pathologist in Charge.*

This garden is located at Chico, Cal. The work has for its object the assembling, propagating, preliminary testing, and distribution of valuable economic plants secured by agricultural explorers from all countries and the establishment of the industry in this country. The Pathologist in Charge is assisted by Edward Goucher.

## COTTON CULTURE FARMS.

SEAMAN A. KNAPP, *Special Agent in Charge.*

The headquarters for this work is Lake Charles, La. Investigations are conducted in Louisiana and Texas for the purpose of demonstrating the possibility of growing diversified crops with greater profit to the farmer than results from confining attention to a single farm product, such as cotton, and also of showing the value of improved cultural methods. Assisting in this work is a corps of special agents, among whom are James A. Evans, William M. Bamberge, and J. P. Slattery.

## FOREST SERVICE.

Forester, GIFFORD PINCHOT; Associate Forester, OVERTON W. PRICE.

The Forest Service collects and disseminates information of practical value bearing on the maintenance, improvement, extension, and utilization of American forests; examines into and reports on the desirability of creating new National forest reserves on public lands, and of extending or modifying the present reserve boundaries, and gives expert assistance to timberland owners, public

and private, to secure the introduction and practice of forest management. It has the technical and business management of the National forest reserves, exercising, under the direction of the Secretary of Agriculture, jurisdiction in all matters involved in the protection, use, and occupancy of the reserves, including the free use of timber and stone, timber sales, grazing, rights of way, and other privileges.

The Service is also charged, through a Special Fiscal Agent, with the receipt and disbursement of all funds derived from the use of the resources of the reserves.

The Service prepares working plans for the conservative lumbering of National, State, and private forests, and supervises their execution. It studies commercially valuable trees to determine how, under forestry, their continued production may be secured and their yield increased; investigates the relation between the forest and fire, grazing, lumbering, stream flow, and irrigation; ascertains and recommends trees and methods suitable for protective and productive planting in different regions, reforests denuded areas on the forest reserves, and gives practical assistance to tree planters; tests the strength and durability of construction timbers, railroad ties, and other materials, and the relative value of different methods of preservative treatment of timber; conducts inquiries into forest products, improvements in the methods of securing them, the saving of waste in their manufacture, and new sources of supply.

The field work of the Service extends to Hawaii and Porto Rico and to Alaska, and embraces also operations in the Philippines. It includes the study of forest conditions and problems all over the country; the mapping of large areas of timberland, chiefly on the public domain, to show the character and utility of the growth; investigations of the grazing and fire problems in the reserves and elsewhere; the giving of advice to owners of forest lands, and to farmers and others in need of planted forest growth for protection or wood supply, and the supervision of conservative lumbering operations, which illustrate forest management on business principles. The land for the management of which the advice of the Service has been asked and furnished is in many tracts, large and small, and is owned by individuals, clubs, corporations, several of the States, and the United States Government.

The organization of the Service comprises ten lines of work: General Inspection, Law, Publication and Education, Dendrology, Grazing, Record, Reserve Organization, Forest Management, Forest Extension, and Forest Products.

#### GENERAL INSPECTION.

FREDERICK E. OLMSTED, *in Charge*.

General Inspection covers all the activities of the Service, both in the reserves and elsewhere. It ascertains and reports exactly what work is being done, and how; and advises with those in charge of projects and in administrative control of the reserves.

#### LAW.

GEORGE W. WOODRUFF, *in Charge*.

The Law work comprises advice to the Service in legal matters, assistance in the prosecution of offenders against the laws and regulations which protect the reserves, aid to persons drafting forest legislation, and a general supervision of other legal problems connected with forests, their ownership, taxation, and protection.

#### PUBLICATION AND EDUCATION.

HERBERT A. SMITH, *in Charge*.

Publication and Education includes the technical and literary review of publications; the supervision of their passage through the press, and charge of all matters of printing; and the general work of education in forestry through public addresses, the press, and other channels.

## DENDROLOGY.

GEORGE B. SUDWORTH, *in Charge*.

This line of work comprises all matters pertaining to the life history of forests and forest trees, including technical studies of the distinguishing characteristics of tree species and their woods. Special attention is given to the geographical and commercial distribution of tree species and forests, and to the investigation of forest resources, which includes investigations of forest areas to determine the kinds, quality, and quantity of timber available. This office studies also the effects of turpentine gathering on the life of resin-bearing conifers and the conditions and treatment under which such trees yield the largest quantities of resin for naval stores.

Another duty of this office is the preparation, installation, and care of forest exhibits.

## GRAZING.

ALBERT F. POTTER, *in Charge*.

Included under this office are the supervision of grazing on all forest reserves, the investigation of range conditions and controversies, and the study of the proper division of the grazing land.

## RECORD.

JAMES B. ADAMS, *in Charge*.

Under Record are included all office and routine matters, that portion of the correspondence relating to the distribution of publications and to matters not technical and not administrative, and the care of the files. The supervision of the purchase of supplies, the care of the quarters, and the custody of field instruments and equipment, of office supplies and furniture, and of the collection of forest photographs and the photographic laboratory, also fall under Record.

## RESERVE ORGANIZATION.

COERT DU BOIS and R. E. BENEDICT, *alternately in Charge*.

Reserve organization is charged with the supervision of the forest reserve force and its equipment and with the examination of lands for the creation of new reserves and for eliminations from and additions to existing reserves. It reviews all administrative business which originates in other offices and thus brings together and harmonizes the work of all branches of reserve administration.

## FOREST MANAGEMENT.

WILLIAM T. COX, *in Charge*.

Forest Management has charge of the preparation of working plans for the National forest reserves, and of the execution of technical work on the reserves. It also assists private owners in the management of their timber lands.

The work on small woodlots is done without expense to the owner, but in the case of large tracts of land the expenses and subsistence of the necessary assistants and helpers for the Service are borne by the proprietor.

Studies are also carried on of the more important timber trees and of various forest problems throughout the United States.

## FOREST EXTENSION.

SAMUEL N. SPRING, *in Charge*.

Forest Extension has to do with the creation of new forest, whether by planting where at present there is none or by assisting an established forest to advance over areas where it is absent or insufficient. Its work consists in the



preparation of planting plans for private land owners, planting on portions of the National forest reserves, and studies in forest replacement, or methods of aiding the forest to occupy new ground and to restore itself where it has been destroyed.

#### FOREST PRODUCTS.

WILLIAM L. HALL, *in Charge*.

This comprises the work of the Service in timber testing, to determine, under such conditions as actually obtain in structural work, the strength and properties of the principal merchantable timbers of the United States; investigations of the durability of railroad ties, telegraph poles, and other forms of timber, of the effects of seasoning and treatment by preservative processes, and of the comparative value of low-grade or abundant timbers, when protected against decay by treatment and against wear by the adoption of mechanical devices, as substitutes for timbers now commonly used; investigations as to improved tie forms, and as to the relation between the mechanical properties of timbers and such factors as the rate of growth, time of cutting, manner of sawing, and the water content; and investigations to discover economical methods of producing turpentine, charcoal, tannic acid, wood pulp, and other products of the forest. It includes also studies of methods of utilizing the waste of sawmills; studies of woods used in the cooperage, vehicle, and implement industries, in street paving, and in box and basket manufacture; the compilation of the different systems of lumber grading; the collection of statistics of forest products; the computation and final statement of all forest measurements obtained by the Service in its several lines of work; and the making of all maps, drawings, and diagrams.

#### BUREAU OF CHEMISTRY.

*Chief*, HARVEY W. WILEY.

The Bureau of Chemistry confines its attention to questions of agricultural chemistry of public interest and other chemical investigations referred to it by the Government. Such investigations include studies on the effects of cold storage on foods, especially on drawn and undrawn poultry, eggs, etc., and physiological experiments to determine the effects of food preservatives and artificial colors on health and digestion. The inspection of imported foods (see Division of Foods), and the execution of the Food and Drugs Act, June 30, 1906, are important phases of the work. Inquiries of value to individuals only, or to a small group of individuals, can not be taken up. In general the Bureau is unable to examine miscellaneous samples sent to it for that purpose. The Bureau, by direction of the Secretary, has charge of all chemical work of the Department not otherwise provided for by law.

#### DIVISION OF FOODS.

W. D. BIGELOW, *Chief*.

The Division of Foods is charged with the study of the composition, nutritive value, and character of adulteration of human foods. In the past much work has been done with the various kinds of food purchased in the open market in order to determine their purity and the character of adulteration commonly practiced. The scope of the work of the Division of Foods in connection with the enforcement of food inspection legislation has been greatly extended by the passage of the Food and Drugs Act, June 30, 1906, which covers foods and drugs entering into interstate commerce, and becomes effective, January 1, 1907. Under the provisions of the law the Secretary of Agriculture is also authorized to continue the inspection of all imported food products, including under this head what are known generally as foods, beverages, condiments, and ingredients used in the manufacture thereof, which inspection has been conducted under the several appropriation acts since March 3, 1903. Every invoice of food products coming into this country is accompanied by a declaration made before a United States consul concerning the character of the shipment. The law requires that each package of food products shall be correctly labeled

or branded in regard to the nature thereof and the place of production or manufacture. It also provides that no substance deleterious to health shall be added to any food product, and that food products which are forbidden or restricted in sale in the country where made or from which exported shall not be admitted into the United States. In the execution of this law collaboration has been established with the State and Treasury Departments. Through the State Department our consuls are instructed to secure from intending shippers a full description of the character of the goods which they propose to send, in the form of a duplicate of the invoice. To this duplicate is attached a declaration made by the shipper to the effect that the food products covered by the invoice in question do not in any way differ from the character of such products required by the inspection law. This invoice and declaration are sent by fast mail direct to the Department of Agriculture. The Treasury Department collaborates in the execution of this law by securing samples of such invoices as may be suspected of being adulterated or misbranded, or of containing a deleterious substance. To facilitate the inspection, laboratories have been established, under the Division of Foods, in the six principal ports of the United States. All food importations are inspected by the chiefs of these laboratories, and at their request samples of the goods are secured by the agents of the Treasury at the ports of entry and forwarded to the laboratories of the Division of Foods at the respective ports for examination. Meanwhile the goods covered by the invoices are detained or removed under bond pending the result of the chemical examination. If this examination shows that the food products are of such a nature as to violate the provisions of the law, the importer is notified and given an opportunity to make such representation as he may desire. When a shipment is found to be contrary to the law the importer is required to send it beyond the jurisdiction of the United States. If this is not done within ninety days from time of notification, the shipment is destroyed by the Secretary of the Treasury.

At ports where no food laboratories have been established samples are taken by the Treasury officials at the port from those shipments designated by the Bureau of Chemistry and sent to Washington, or to the nearest laboratory of this Bureau, for examination.

The study of the influence of preservatives and coloring matters on health and digestion has formed an important part of the work of this Division since its inception in 1902. During one year more than 15,000 analytical determinations were made.

Chemical work in connection with the study of the relation of cold storage to the wholesomeness and nutritive value of foods is performed in this Division. This investigation includes the natural ripening of the fruit on the tree, and the changes that take place on storing at ordinary temperature and in cold storage. In connection with it certain technical problems have been investigated including the manufacture of vinegar, the preservation of cider by means of pasteurization in sealed packages, and improved processes for the ripening of persimmons.

Investigations for the improvement of methods of analysis and the securing of data on which food standards may be based are constantly in progress, being conducted in connection with the work of the joint committee of the Association of Official Agricultural Chemists and the Association of State and National Food and Dairy Departments, which cooperate with the Secretary of Agriculture in determining the purity of foods under authority of Congress.

#### SUGAR LABORATORY.

C. A. BROWNE, Jr., *Chief*.

The Sugar Laboratory is charged with the chemical study of sugars and other carbohydrates. One of its principal duties is to examine samples of sugar-bearing plants, especially those grown for experimental purposes at the various agricultural experiment stations, as in the case of sugar beets, sugar cane, and sweet corn. The chemical work relating to the domestic sirup industry—that is, the manufacture of table sirup from the maple sap, sorghum, and sugar cane—is performed in the Sugar Laboratory, which also collaborates with the International Commission for Uniform Methods of Sugar Analysis in the standardization of international quartz plates for the control of polariscopes in different countries.

Among the lines of work conducted by the Sugar Laboratory are investigations pertaining to the economic production of alcohol from various trade wastes, such as the refuse from the canning industries. A study of the composition of the commercial extracts and preparations of malt is also being made.

The Sugar Laboratory, in connection with the work of the Association of Official Agricultural Chemists, has under investigation methods for the analysis of sugars, molasses, honey, and other saccharine products.

#### DAIRY LABORATORY.

G. E. PATRICK, *Chief*.

The Dairy Laboratory examines dairy products of every description and studies methods for such examination. A large part of the work is done in cooperation with the Bureau of Animal Industry, which is charged with the enforcement of the law regulating the sale and manufacture of renovated butter (May 9, 1902).

The Dairy Laboratory examines samples of dairy products taken by the customs officers in the enforcement of the imported-food law and samples of dairy products received from other sources are examined whenever such work promises to be of public benefit. The milk and butter consumed in the experiments conducted by the Bureau of Chemistry upon the physiological effects of preservatives and coloring matters are also analyzed in this laboratory.

This laboratory also works in cooperation with the Dairy Division of the Bureau of Animal Industry in studying the composition and digestibility of cheese made in various ways and cured at different temperatures.

#### MISCELLANEOUS LABORATORY.

J. K. HAYWOOD, *Chief*.

The Miscellaneous Laboratory of the Bureau of Chemistry was first organized as the Insecticide and Agricultural Water Laboratory, but took the present name on July 1, 1905. The principal lines of work of the laboratory are: (1) The composition, analysis, preparation, and action of insecticides and fungicides; (2) the composition, medicinal action, and general therapeutic uses of mineral waters of the United States, the composition and applicability of irrigation waters, study of the methods of sanitary water analysis, and the sanitary water supplies of small towns; (3) the composition, analysis, and adulteration of cattle foods; (4) the action of trade wastes on forest and agricultural products; (5) the occurrence of certain poisons in articles in general use (fabrics, furs, wall papers, etc.) and their effect on the human body; (6) miscellaneous work of the Bureau of Chemistry.

#### DRUG LABORATORY.

LYMAN F. KEBLER, *Chief*.

The Drug Laboratory has for its object the study of the properties, composition, and quality of drugs and medicinal preparations of all kinds. A large part of its work consists in the study of official and new methods and the acquisition of data which may lead to more satisfactory and accurate analytical processes. Special attention is given to the analysis of crude drugs and products derived from them. The Chief of the Drug Laboratory as Referee on Medicinal Plants and Drugs of the Association of Official Agricultural Chemists has undertaken a collaborative study of drug assay methods. Many samples of manufactured pharmaceutical preparations have been examined for the Council on Pharmacy and Chemistry of the American Medical Association. The several departments of the Government submit samples of drug products to this laboratory for examination, and in accordance with the provisions of the appropriation act many fraudulent medicinal products are investigated for the Post-Office Department. All chemical supplies bought upon contract by the Bureau of Chemistry are examined in the Drug Laboratory previous to their acceptance.

Under the Food and Drugs Act of June 30, 1906, the examination of all imported drugs and medicinal preparations and of all drug products which



enter into interstate commerce is delegated to this laboratory. This act also prohibits the importation of all adulterated or misbranded drug products. The examinations and analyses incidental to the enforcement of these provisions are also made in the Drug Laboratory.

#### CONTRACTS LABORATORY.

P. H. WALKER, *Acting Chief.*

The Contracts Laboratory examines materials to be purchased by the United States Department of Agriculture to determine their purity and compliance with specifications, and does the collaborative work with other departments. The work of this laboratory consists largely of the examination of materials submitted with bids for contracts or furnished on contract for the various Executive Departments. It includes also the examination of a large number and variety of materials regarding which there has arisen some question of classification for dutiable purposes.

Among the more important lines of contract work may be mentioned the investigation and examination of inks and other materials used by the Post-Office Department for postmarks and for canceling stamps; the examination of supplies for the Commissary Office, War Department, and the examination of chemical glassware used in the Bureau of Chemistry; the examination of typewriter ribbons and inks used by the various departments, and the examination of supplies used by the Navy Department, by the Department of the Interior, and by the Government Printing Office.

#### PLANT ANALYSIS LABORATORY.

C. C. MOORE, *Chief.*

This laboratory is charged with the investigation of the constitution of plants and is authorized to collaborate with the Bureau of Plant Industry in the chemical investigation of problems in which the Bureau of Chemistry and the Bureau of Plant Industry are mutually interested. Among the problems thus studied are the following: The composition of cereals grown under different environments; the effect of various plant foods on the gluten and other valuable constituents of wheat; the quality of barley grown in different States; the deterioration of durum wheat, due to white spot, etc.

The composition of fertilizers is also studied.

#### MICROCHEMICAL LABORATORY.

B. J. HOWARD, *Chief.*

This laboratory is charged with the microscopical and microchemical study of foods, drugs, cattle feed, paper and textile materials, miscellaneous agricultural products, etc. Special attention is given to the histological study of fruits, spices, cereals, starches, and other agricultural products, both on account of its scientific interest and for the purpose of perfecting methods for detecting the adulteration of these products. The laboratory makes microscopical examinations of the urine and blood in connection with the work of the Bureau on the influence of preservatives on nutrition.

#### LEATHER AND PAPER LABORATORY.

F. P. VEITCH, *Chief.*

This laboratory conducts investigations of tannins and tanning materials and their effects upon the strength and properties of leather, with a view to promoting the agricultural industries relating to the production of tannins and tanning materials and leather of a high quality; all technical problems of a chemical nature relating to the production of tannins and tanning products; all technical problems of a chemical nature relating to the production of leather; all chemical and physical investigations of papers in regard to their fitness for



use in the Department of Agriculture, and other departments of the Government which may request such investigations; all technical problems of a chemical nature relating to the production of paper, with a view to promoting the agricultural industries connected with the production of the raw materials and to the improvement of the quality of papers made; chemical-technical investigations of turpentine and resins for the purpose of determining their chemical nature and industrial uses and improving processes of production; chemical-technical investigations of the destructive distillation of wood for the purpose of profitably utilizing waste and other woods, and to improve the quality and quantity of the products resulting therefrom; chemical-technical investigations of rubber for the purpose of determining the factors upon which values depend, and studies of methods of coagulation, and to increase the yield of crude rubber.

#### SPECIAL INVESTIGATIONS.

(Under the immediate direction of Chief of Bureau.)

In collaboration with the Weather Bureau of the Department of Agriculture and with a number of the State agricultural experiment stations, this Bureau is specifically directed by Congress to study the influence of environment upon the chemical composition of wheat, barley, and the sugar and starch producing plants. The need of further study of this subject is generally recognized, and this Bureau has the active collaboration of a considerable number of the State experiment stations in its prosecution.

Enological investigations are carried on under the direction of Mr. William B. Alwood, special agent of the Bureau of Chemistry. The investigation divides naturally into two parts, one dealing with the study of alcoholic ferments and the mal-organisms associated with them in fruit musts, ciders, wines, and fruit by-products; the other with the composition of fruits and fruit juices and their fermented products, and the critical examination of the residue which is left in the marc or pomace as a comparatively waste product.

Special investigations in connection with the work of establishing standards of purity for food products are conducted, sometimes on large scale, by the various laboratories of the Bureau. As an illustration of this kind of work, there may be cited the analysis of dairy products in the Dairy Laboratory for the purpose of establishing standards therefor; wines, in the Division of Foods; and whisky in various laboratories.

#### BUREAU OF SOILS.

*Soil Physicist and Chief of Bureau*, MILTON WHITNEY; *Chief Clerk*, A. G. RICE.

The Bureau of Soils is charged with the study of soils in their relation to practical agriculture; with the investigation of the physical and chemical properties of soils; with the investigation of the materials and methods involved in artificial fertilization and its influence upon the original soils; with the classification and mapping of soils in agricultural districts to show the distribution of the various soil types, with a view to determining their adaptability to certain crops and their management and treatment; with the investigation of alkali problems, their relations to irrigation and seepage waters, the causes of the rise and accumulation of alkali, and the reclamation of abandoned alkali lands; with the investigation of tobacco soils and of the methods of cultivating and of curing the crop, with special reference to fermentation, the introduction of improved varieties into the principal tobacco districts of the United States, and the securing, as far as may be possible, of a change in the methods of supplying tobacco to foreign countries.

#### LABORATORIES.

FRANK K. CAMERON, *Soil Chemist, in Charge.*

The Laboratories of the Bureau of Soils have under their charge the investigation of the chemical properties of soils in their relation to plant growth; the chemical examination and analysis of soil types and the study of their requirements with regard to fertilizers; the investigation of alkali problems, and the general direction of chemical methods in use by field parties. The Laboratories are also charged with the investigation of the physical properties of soils

and their economic bearing; the physical examination and mechanical analysis of soil types for soil survey parties; the preparation and testing of apparatus used in field work; and the investigation from a physical standpoint of such mechanical soil problems as arise.

The Laboratory Assistants are as follows: J. M. Bell, H. Bryan, G. H. Failyer, C. C. Fletcher, F. E. Gallagher, D. H. Hill, W. J. Latimer, H. E. Patten, W. O. Robinson, J. G. Smith, W. C. Taber, W. H. Waggaman, and H. R. Wade.

#### SOIL SURVEY.

JAY A. BONSTEEL, *in Charge*.

The Soil Survey is charged with the classification of soil types and the actual surveying and mapping of selected areas in various parts of the United States, the results of which are published each year in separate form and at the end of the year collectively in Field Operations of the Bureau of Soils. This report includes a description of the areas, history of settlement and agricultural development, climatic conditions, characteristic soil types, special soil problems, methods of cultivation and irrigation, drainage and seepage waters, alkali, reclamation of abandoned lands, and general agricultural conditions. Accompanying these reports are also lithographic maps indicating in colors the location and distribution of principal soil types. Mechanical analyses of these soil types compiled by the laboratories are also given, and recommendations are made looking to improved methods of fertilization and cultivation and the possibilities of the introduction of new crops. Assistants in the Soil Survey are: E. R. Allen, O. L. Ayrs, H. L. Belden, Frank Bennett, H. H. Bennett, J. L. Burgess, Thomas A. Caine, M. E. Carr, W. T. Carter, jr., George N. Coffey, W. J. Geib, W. E. Hearn, L. A. Hurst, Henry Jennings, G. B. Jones, A. E. Kocher, J. E. Lapham, Macy H. Lapham, Ora Lee, jr., W. S. Lyman, A. W. Mangum, C. J. Mann, C. W. Mann, W. E. McLendon, F. N. Meeker, C. N. Mooney, T. D. Rice, F. C. Schroeder, C. F. Shaw, H. C. Smith, A. T. Sweet, G. W. Tailby, W. E. Tharp, H. L. Westover, H. J. Wilder, R. A. Winston, and E. L. Worthen.

#### TOBACCO INVESTIGATIONS.

GEORGE T. MCNESS, *Tobacco Expert, in Charge*.

The study of the adaptability of certain soils to the production of different varieties of tobacco, and of the methods of cultivation and curing, and the introduction of improved types into areas adapted to them, constitute the principal lines of work of this branch of the Bureau. Practical experiments are being conducted with a view to the introduction of the finer grades of Sumatra and Havana cigar types, and further experiments will be carried on looking to the improvement and increased production of standard varieties in sections where they are already grown. The introduction and successful growth of the high-priced Sumatra wrapper in Connecticut, which promises to practically do away with the importation of about \$6,000,000 worth of tobacco per annum, and the improved method of fermentation in Pennsylvania, resulting in a saving of considerably over half a million dollars annually to the tobacco trade of that State, may be cited as illustrations of the lines of work intrusted to this branch of the service. The study of the requirements of foreign markets and of the methods of cultivation, curing, and marketing in competing countries, and the dissemination of information thus obtained, fall within the province of this division. Assistants in this work are: George B. Massey, W. M. Hinson, L. W. Ayer, E. H. Mathewson, Otto Olson, Harry Rich, R. S. Epley, W. W. Green, G. W. Harris, W. B. Schrader, and R. W. Rowe.

#### ALKALI RECLAMATION INVESTIGATIONS.

CLARENCE W. DORSEY, *Scientist, in Charge*.

This division is engaged in study of the alkali problem of the western United States. Methods of reclamation have been demonstrated, under different conditions of soil and climate, in Utah, Montana, Washington, California, and Arizona, and the valuable information collected is being used by the farmers in the reclamation of their lands. Assistants are: W. W. Mackie, A. T. Strahorn, J. F. Warner, and L. C. Holmes.

## SOIL MANAGEMENT.

FRANK D. GARDNER, *Soil Expert, in Charge.*

The Division of Soil Management has recently been organized for the comprehensive study of soils in their most direct relations to practical agriculture. Supplementing particularly the work of the Soil Survey, this division is concerned with the study of special problems encountered by Soil-Survey parties and with the establishment and practical demonstration of improved methods of cultivation and handling of farm lands.

The adaptation of soils to crops, the study of the distribution and source of plant foods, fertilizer requirements of different soil types, and the practical demonstration of important results of the work of the Bureau of Soils come within the province of this division. The assistants are: James H. Beattie, J. C. Britton, L. A. Kolbe, J. E. McClintock, G. R. Maynardier, J. W. Nelson, F. R. Reid, A. M. Sanchez, F. D. Stevens, Henry Winckelmann, O. L. Eckman, and W. G. Smith.

## FERTILITY INVESTIGATIONS.

OSWALD SCHIREINER, *Scientist in Soil Fertility, in Charge.*

The Laboratory of Fertility Investigations is engaged in the study of the causes of infertility in soils, and is investigating at present the nature of toxic substances in such soils; the action of manures and fertilizers in overcoming the infertility of soils; the rôle of manures and fertilizers in soils, particularly whether they act upon the soil or upon the plants, and with reference to the amounts, ratio, time of action, and residual effects, together with the chemistry of green manuring; and problems in soil physiology, including such conditions in the soil as result from plant or bacterial life. The assistants are: E. C. Shorey, H. S. Reed, Charles A. Jensen, J. F. Breazeale, Bailey E. Brown, J. J. Skinner, and A. M. Jackson.

## BUREAU OF ENTOMOLOGY.

*Entomologist and Chief*, L. O. HOWARD; *Acting Chief in absence of Chief*, C. L. MARLATT; *Chief Clerk*, R. S. CLIFTON.

The Bureau of Entomology obtains and disseminates information regarding injurious insects affecting field crops, fruits, small fruits, and truck crops, forests and forest products, and stored products; studies insects in relation to diseases of men and other animals, and as animal parasites; experiments with the introduction of beneficial insects, and with the fungous and other diseases of insects, and conducts experiments and tests with insecticides and insecticide machinery. It is farther charged with the investigations in apiculture and sericulture. The information gained is disseminated in the form of bulletins and circulars. Much museum work is done in connection with the department of insects of the National Museum, and insects are identified for experiment stations and other public institutions and private individuals.

The work of this Bureau is organized under the following sections:

## INVESTIGATIONS OF INSECTS AFFECTING COTTON AND OTHER SOUTHERN FIELD CROPS.

W. D. HUNTER, *in Charge.*

The investigation of the Mexican cotton boll weevil and the bollworm and other cotton pests is the principal field of work under this section, which also includes the insect enemies of other southern staples, such as tobacco, sugar cane, rice, etc.

## CEREAL AND FORAGE-PLANT INSECT INVESTIGATIONS.

F. M. WEBSTER, *in Charge.*

This line of work comprises investigations on the insect enemies of wheat, corn, and other grains; clover, timothy, alfalfa, etc. Illustrative of this work are the investigations of this Bureau on the chinch bug, Hessian fly, and other grain pests, and on the various injurious species of grasshoppers or locusts.



## INVESTIGATIONS OF INSECTS AFFECTING DECIDUOUS FRUITS.

A. L. QUAINANCE, *in Charge*.

This field of inquiry includes the study of the insect enemies of such orchard fruits as apple, pear, and quince, and the stone fruits, peach, plum, etc., and also the grape; the work on the codling moth, curculios, peach borers, and grape rootworms, and many allied pests come under this heading.

## INVESTIGATIONS OF INSECTS AFFECTING TROPICAL FRUITS.

C. L. MARLATT, *in Charge*.

Under this head come all investigations of insects affecting the citrus fruits, pineapple, olive, and fig, and all other tropical and subtropical fruit cultures. The investigation of the white fly in Florida, and black scale and other common scale pests in California, and the experimental work with hydrocyanic-acid gas and other means of control of these pests come in this section.

## TRUCK CROP AND SMALL FRUIT INSECT INVESTIGATIONS.

F. H. CHITTENDEN, *in Charge*.

This field of investigation relates particularly to the insects affecting garden vegetables and small fruits, and is facilitated by the maintenance of a small plat in the Department grounds for the experimental study of the insects affecting such crops. The enormous increase in truck farming and in the growth of small fruits in this country leads to constant demands for special information covering this field.

## FOREST AND FOREST PRODUCT INSECT INVESTIGATIONS.

A. D. HOPKINS, *in Charge*.

This field of work is carried on in cooperation with the Forest Service, and has for its object the study of the insects injuriously affecting forest trees and their products, including felled timber, tan bark, building material, and all articles of wood employed in the useful arts. All serious insect outbreaks in the national forest reservations or in other natural forests are investigated and recommendations given which will decrease or terminate the losses resulting therefrom. Practical tests in the forest are in operation to demonstrate the possibility of controlling the principal insect enemies of the more important native trees.

## INSECTICIDE AND INSECTICIDE MACHINERY INVESTIGATIONS.

C. L. MARLATT, *in Charge*.

This section covers the entire field of practical experimentation with insecticides and insecticide machinery. A chemist working in cooperation with this Bureau is detailed by the Bureau of Chemistry to take charge of the analyses and tests of new insecticides. Field operations and experiments are conducted on growing trees and vegetables. The enormous increase in the employment of mineral oils as a means of destroying insects has led to a special investigation of this subject, which is now in progress.

## INVESTIGATIONS OF INSECTS AFFECTING STORED PRODUCTS.

F. H. CHITTENDEN, *in Charge*.

Under this head fall all the investigations of the insect enemies of such materials as stored grain, flour, meal, and prepared cereals and leguminous seeds, dried fruits, nuts, drugs, tobacco, and herbarium specimens, as well as all dried meats, and other animal products, such as cheese, leather, hides, wool, various fabrics, etc. The investigations are directed toward a study of life histories and the determination of means of preventing the ravages of the insects concerned.



## INVESTIGATIONS OF INSECTS AFFECTING SHADE TREES AND ORNAMENTAL PLANTS.

(Under the immediate direction of the Entomologist, assisted by F. H. Chittenden.)

This constitutes a section separate from the investigations on the insect enemies of forests, and although some of the insects are identical the problem of how to deal with them is in most cases quite distinct. It includes the economic treatment of borers, tree defoliators, scales, and aphides, as well as other insects that affect trees in public parks and in the streets of large cities. A number of insects of this class, importations from Europe, such as the leopard moth, gipsy moth, brown-tail moth, and imported willow curculio, are demanding more attention year by year. This section includes also investigations of insects affecting greenhouse and garden ornamental plants and trees.

## INVESTIGATIONS OF INSECTS IN RELATION TO DISEASES OF MAN AND OTHER ANIMALS AND AS ANIMAL PARASITES.

(Under the immediate direction of the Entomologist.)

This field of investigation has assumed very great importance during the last few years as a result of the connection established between the mosquito and various diseases, such as malaria and yellow fever, and the agency of the house fly in the dissemination of typhoid fever. It covers not only the rôle played by insects as conveyors and disseminators of diseases among man and the lower animals, but also deals with insects as internal and external animal parasites, including such species as the biting hornfly, gadflies, buffalo gnats, ticks, etc.

## APICULTURAL INVESTIGATIONS.

E. F. PHILLIPS, *in Charge*.

The importance of the apiarian interests of America are recognized by the establishment of an office for special investigation in this field. Inquiry is under way to determine what crops may be profitably employed to fill the gaps in the honey yield or to create artificial pasturage for apiaries, and efforts are being made also to introduce new honey-producing plants from abroad. The different races of bees are being tested to determine their relative availability for this country, and experiments are being conducted in the crossing of different varieties looking to the production of a superior honey-producing strain. The diseases of bees are also receiving thorough investigation.

## SERICULTURAL INVESTIGATIONS.

(Under the immediate direction of the Entomologist, assisted by C. J. Gilliss.)

The work authorized by Congress for the conduct of special investigations of the subject of silk raising in America is conducted by this section. Large quantities of mulberry plants are being distributed throughout the country. There has also been a considerable importation of silkworm eggs, or "seed," which have also been widely distributed. Two modern power reels have been brought from France and are now being operated at the Department in Washington, so that the small lots of cocoons produced by individual experimenters in this industry may be reeled and find a market. For the present this office has adopted the policy of purchasing the cocoons raised at the current market rate. The intention is to make a determined effort to establish silk raising on a practical basis in this country.

## INTRODUCTION OF FOREIGN BENEFICIAL INSECTS.

(Under the immediate direction of the Entomologist, assisted by E. S. G. Titus, in charge of gipsy moth parasite laboratory.)

Results of extraordinary value in the control of certain imported insect pests have been secured by the introduction of their natural enemies, and two or three notable successes have resulted in the annual saving of more than the cost

of the Bureau of Entomology since its origin as a Division. The introduction of enemies of the boll weevil and the gipsy and brown-tail moths comes in this field. When such work is carried out by expert entomologists there need be no risk of introducing injurious forms, but if attempted by others there is danger of the introduction of harmful species.

#### GIPSY AND BROWN-TAIL MOTH FIELD WORK.

D. M. ROGERS, *in Charge*.

Under a special appropriation by Congress the Bureau is endeavoring to prevent the further spread of the gipsy and brown-tail moths in New England.

#### WHITE FLY INVESTIGATIONS.

C. L. MARLATT, *in Charge*, assisted by A. W. MORRILL.

Under a special appropriation by Congress the Bureau is investigating the white fly, an insect which is damaging citrus fruits in the Gulf States.

#### GENERAL INVESTIGATIONS.

(Under the immediate supervision of the Entomologist.)

Much work accomplished by this office does not fall under any of the headings previously noted. Such are supervision of quarantine operations, propagation and distribution of fungous diseases of insects, and the identification of material for experiment stations and individuals, not only in the United States but in various foreign countries. A great deal of technical work is also done by the employees of this office, most of whom are specialists in some particular group of insects and do more or less work in the classification and care of the museum material coming directly under their hands. No little part of the work is also represented by the correspondence, which is very voluminous. The preparation of bulletins and circulars and general reports covering the general investigations already referred to is a very important feature of the work.

#### BUREAU OF BIOLOGICAL SURVEY.

*Chief*, C. HART MERRIAM; *Administrative Assistant*, H. W. HENSHAW.

The Bureau of Biological Survey studies the geographic distribution of animals and plants, and maps the natural life zones of the country; it also investigates the economic relations of birds and mammals, recommends measures for the preservation of beneficial and the destruction of injurious species, and is charged with carrying into effect the provisions of the Federal laws for the importation of wild birds and other wild animals, and for the protection of game by control of interstate trade in game, and by other means.

The Bureau is divided into three divisions, the work being distributed as follows: (1) Biological surveys and investigations of the geographic distribution of mammals and birds, in charge of Vernon Bailey; (2) investigations to determine the relation of birds and mammals to agriculture, their food habits, etc., in charge of A. K. Fisher; (3) supervision of matters relating to protection of game and the importation of foreign birds and animals, in charge of T. S. Palmer.

#### DIVISION OF ACCOUNTS AND DISBURSEMENTS.

*Chief*, A. ZAPPONE; *Assistant Chief*, EDGAR B. CALVERT; *Auditor*, EVERETT D. YERBY; *Cashier*, M. E. FAGAN.

The Division of Accounts and Disbursements audits, adjusts, and pays all accounts and claims against the Department; decides questions involving the expenditure of public funds; prepares advertisements and schedules for annual supplies, and letters of authority; writes, for the signature of the Secretary,

all letters to the Treasury Department pertaining to fiscal matters; examines and signs requisitions for the purchase of supplies and issues requests for passenger and for freight transportation; prepares the annual estimates of appropriations, and transacts all other business relating to the financial interests of the Department.

### DIVISION OF PUBLICATIONS.

*Editor and Chief*, GEO. WM. HILL; *Assistant Chief*, JOS. A. ARNOLD; *Chief Clerk*, A. I. MUDD.

The Division of Publications is the publishing house of the Department of Agriculture. Its force comprises editors, proof readers, compilers, indexers, abstracters, artists, draftsmen, engravers, and photographers, together with clerks and laborers engaged in the distribution of the publications. The Division is charged with (1) preparation and editing of the manuscripts for the publications of the Department, including the Yearbook, annual reports, bulletins, etc.; (2) the preparation, printing, and distribution of Farmers' Bulletins; (3) supervision and equitable assignment of printing fund (\$275,000); (4) the general direction of expenditures under the appropriation including Farmers' Bulletins, artists and illustrations, artists' material, and material and labor in the distribution of documents, amounting to \$248,520—the two funds aggregating \$523,520; (5) the supervision of the printing and binding done for the Department in both the main and the branch office of the Government Printing Office; (6) the preparation of drawings for illustrations, of wood engravings, and photographic work; (7) the distribution of Department publications; (8) the preparation and distribution of official information and of advance notices of publications to agricultural writers and papers. The Division of Publications is the authorized medium of all official communications between the Department of Agriculture and the Government Printing Office.

### EDITORIAL WORK.

B. D. STALLINGS, *in Charge*.

The editorial work involves the editing and preparation for printing of all the publications of the Department—with the exception of those issued from the Weather Bureau—including the Yearbook and Farmers' Bulletins. The total number of printed pages of new matter so edited and prepared in the fiscal year 1906 was 20,942, besides 29,411 of matter revised or reprinted. It involves also the general oversight and proof reading of all the job work and other printing done in the Branch Printing Office. The number of requisitions for printing issued to the Public Printer from the editorial office during the fiscal year 1906 was: Main Office, 1,631; Branch Office, 4,502.

The editorial corps includes assistant editors as follows: S. Edwin Thornton, Ephraim Cornman, W. F. Harding, and G. W. Kennedy.

### INDEXING.

CHARLES H. GREATHOUSE, *in Charge*.

This branch of the work is occupied with the preparation of indexes of Department publications for immediate use in the Division, and for publication and distribution. The indexes of the Yearbook and some other publications which have indexes printed under the same covers with the text are also made here. Translation and compilation of information, for use in the Division and for publication, are usually assigned to the indexing section.

### YEARBOOK.

(Under the immediate supervision of the Editor.)

The preparation of the Yearbook of the Department, which occupies a considerable portion of the time of this Division, involves the selection of timely articles and the presentation of the year's progress in agriculture. The editing



of this material and putting it in form for the printer, the selection and making of illustrations, reading proof, indexing, and final supervision of publication is in progress during the greater part of each year.

The Yearbook is edited, under the personal direction of the Secretary, by the Editor and Chief.

#### FARMERS' BULLETINS.

(Under the immediate supervision of the Assistant Chief.)

The Division of Publications is charged with the preparation and issue of short treatises in plain language which will be directly useful in farming. These publications are intended to give clear directions for work without discussion or theory. They are expected to embody the settled results of investigations, but also present other important agricultural methods or facts not otherwise brought to the attention of farmers generally. Under the law four-fifths of all the Farmers' Bulletins printed are distributed upon the orders of Senators, Representatives, and Delegates in Congress. The total number of these bulletins printed during the last fiscal year was 6,568,000 copies.

#### DOCUMENT SECTION.

R. B. HANDY, *in Charge*.

Under section 92 of the act providing for the public printing and binding and the distribution of public documents, approved January 12, 1895, the duty of distributing the publications of the Department of Agriculture is assigned by the Secretary to the Editor and Chief, who is required to keep a detailed account of all publications received and distributed and to take measures to avoid duplication.

This Section receives from the Public Printer, cares for, and distributes all the publications of the Department of Agriculture. A large force of clerks and laborers is employed in directing franks under which the documents are mailed, in keeping account both of their distribution to Congressmen and to miscellaneous applicants, and in storing, folding, wrapping, and other work incidental to mailing the publications.

The extensive correspondence with applicants for publications, the keeping of card indexes, the preparation of registry lists, and the care of the mailing lists of the Department necessitate the employment of a corps of clerks, stenographers, and typewriters.

#### ILLUSTRATIONS.

L. S. WILLIAMS, *in Charge*.

In this branch of the work a corps of artists, draftsmen, wood engravers, photographers, and clerks is engaged in the preparation of the illustrations for the publications of the Department. In the type room are preserved the original cuts of these illustrations (except lithographs), from which electrotypes are furnished to applicants at a nominal cost.

#### DEPARTMENT PRINTING OFFICE.

(Under the immediate supervision of the Chief.)

The Department Printing Office is a branch of the Government Printing Office; Frank Wallace, foreman, in charge. It is utilized for the printing of letter heads, envelopes, note heads, circulars, labels, blanks, postal cards, etc. Since the office was by law made a part of the Government Printing Office its facilities have been greatly increased and the quality of the work very much improved, so that work that was of necessity formerly sent to the main office is now done satisfactorily in the Branch Office. During the last year the various kinds of job work done aggregated 22,754,912 pieces.

Under the law the Editor and Chief of the Division of Publications is designated by the Secretary of Agriculture to be responsible for the work done in the Branch Office, and he is required to make out all requisitions for work therein and submit a quarterly report thereon.



## BUREAU OF STATISTICS.

*Statistician and Chief of Bureau, VICTOR H. OLMSTED; Assistant Statistician and Assistant Chief of Bureau, C. C. CLARK; Chief Clerk, E. J. LUNDY.*

The Bureau, through the agency of a large number of correspondents, collects statistics and makes estimates concerning the products of agriculture. It estimates the area annually sown to corn, wheat, oats, barley, rye, buckwheat, flax, potatoes, hay, cotton, and tobacco, and collects information throughout the growing season concerning the condition of these crops, as to growth and vitality, on the first day of each month. At the close of the crop year it calculates the quantitative results of the harvest of each of these products and estimates their farm value on December 1. Complementary to the above system, it collects information at regular intervals concerning the growth and vitality of meadows, pastures, clover, timothy, sugar cane, sorghum, rice, hops, apples, peaches, pears, grapes, and other crops. Similar information as to the principal foreign crops is obtained through a special foreign agent of the Bureau and through consular, agricultural, and commercial authorities.

The Bureau makes estimates of the stocks of corn, wheat, and oats held on farms in the United States on certain fixed and regular dates, and indicates what part of these crops has then been shipped out of the county where grown.

Under the direction of the Statistician particular subjects affecting agricultural interests are investigated, and the results of such investigations are published in bulletin form, and the conditions of agricultural supply and demand in foreign countries are studied with the object of extending the foreign trade of the United States.

Estimates are made of the number and value, by species, of animals on farms in the United States at the beginning of each year, and the annual losses from disease and exposure are indicated. Estimates are made of the average weight of wool fleeces by States and Territories.

The Bureau compiles and tabulates, from official and commercial sources, the world's production, by countries, of corn, wheat, oats, barley, rye, rice, sugar, cotton, flax, tobacco, and hops; and records and tabulates prices of the principal agricultural products in various markets of the United States.

It also records, tabulates, and coordinates statistics of agricultural production, distribution, and consumption, the authorized data of governments, institutes, societies, boards of trade, chambers of commerce, produce exchanges, trade journals, and individual experts.

Concise statements of the more important results of these investigations concerning domestic agriculture are promptly and simultaneously disseminated by telegraph through all the States and Territories; and cards, upon which are printed such results as soon as ascertained each month, are immediately sent by mail to every postmaster in the United States to be conspicuously posted in his office for the information of the public. Detailed statements of the results of investigations concerning both domestic and foreign agriculture are issued through an official monthly publication entitled the *Crop Reporter*, designed for general circulation among producers and consumers.

## CROP REPORTING BOARD.

VICTOR H. OLMSTED, *Chairman.*

Crop reports are made up each month from the results received from the several corps of correspondents by a Crop Reporting Board composed of the Chief of the Bureau of Statistics, as chairman, and four individual members selected each month from the officials of the Bureau at Washington and members of the Special Field Service and State Statistical Agents called to Washington on report days for that purpose. Thus four members of this Board are selected each report day from a corps of over fifty men, well trained and thoroughly informed as to crop conditions, and as to the relative value and the correctness of the reports from the different corps of correspondents.

The members of the Board for the past twelve months, in addition to the chairman each month, were as follows: From the Department at Washington, C. C. Clark and George K. Holmes; from the Special Field Service, Nat. C.

Murray, F. N. Gray, J. J. Darg, P. L. Hutchinson, J. P. Killebrew, and T. C. Shaw; and from State Statistical Agents, W. A. Withers, S. Arthur Knapp, James H. Lane, E. M. Hemphill, H. T. Bradford, and W. J. Northen.

#### DIVISION OF DOMESTIC CROP REPORTS.

FRED J. BLAIR, *Chief.*

The Division of Domestic Crop Reports handles the reports of the various classes of crop correspondents of the Bureau of Statistics throughout the United States. Blank schedules are sent each month to township, county, and State correspondents, to be used by them in making their reports regarding crop areas and conditions, quantities and qualities of production, live stock, etc., as indicated in the preceding description of the work of the Bureau of Statistics. These reports, when received, are tabulated for the use of the Statistician in compiling his monthly reports as published by the Department of Agriculture in the Crop Reporter. At intervals blank schedules are sent to cotton ginner, individual farmers, and special correspondents to be used by them in making reports regarding cotton, live stock, and the areas and quantities of various crops, which are tabulated for the Statistician's use in the same manner as the reports referred to.

An important branch of the work of this Division consists in keeping filled the ranks of the Bureau's crop correspondents, who number nearly two hundred thousand, among whom numerous changes—both in personnel and post-office addresses—occur from month to month.

The voluntary correspondents make reports on acreage, condition, and yield of various crops, and on the numbers and values of live stock, from time to time.

The Chief of this Division has charge of the making of such statistical computations and compilations as are required for the use of the Bureau of Statistics and for other Bureaus of the Department of Agriculture which have need of such work.

The mailing lists of the Bureau are under the direction of the Chief of this Division, who also has charge of receiving, assorting, and distributing the voluminous daily mail of the Bureau.

#### FIELD SERVICE.

The service outside of Washington consists of the Special Field Service; 44 State Statistical Agents; 4 Special Agents at the Minnesota Experiment Station; 1 Special Agent in California, and about 150,000 voluntary correspondents.

#### SPECIAL FIELD SERVICE.

(Under immediate direction of Chief of Bureau.)

Special Field Agents: H. M. Creel, J. J. Darg, S. D. Fessenden, F. W. Gist, F. N. Gray, H. H. Johnson, G. W. Knorr, Nat. C. Murray, F. S. Pinney, W. L. Pryor, H. M. Rhoads, T. C. Shaw, and B. C. White; Special Agent on Rice, De Lancey Evans; Special Agent on Tobacco, J. P. Killebrew.

Each Special Field Agent systematically traverses the agricultural sections of the United States within a certain designated district or group of States, carefully notes the development of each important crop, keeps in close touch with the best informed opinion throughout the country, and reports to the Statistician. The Special Agent on Rice and the Special Agent on Tobacco traverse all portions of the United States in which the respective agricultural products upon which they report are produced.

The Special European Agent, C. M. Daugherty, resides in London, England, and is in charge of foreign crop reports. His duty is to keep in close touch with the statistical offices of the various European governments, by correspondence and by travel throughout the agricultural sections of Europe, and to secure and report information of value to agricultural interests of the country.

The State Statistical Agents maintain special corps of county correspondents and report to the Statistician upon agricultural conditions for the States they

represent. In addition, the majority are authorized to travel over their respective States at least twice each year, thus keeping in close touch with their correspondents who in this way are able to give them much valuable information.

#### DIVISION OF FOREIGN MARKETS.

GEORGE K. HOLMES, *Chief.*

The Division of Foreign Markets has for its object the extension of the agricultural export trade of the United States. The organization of the Division was prompted by the need of wider foreign markets, resulting from an extraordinarily rapid development of domestic agriculture.

The conditions of demand and supply in foreign countries are studied, and for this purpose the official statistics of production, importation, and exportation published by the various governments are used. These statistics are supplemented by further details obtained from reports of consular officers, from trade journals, and from various other sources of information. The official customs returns of the United States, so far as they relate to agricultural products, are also carefully examined, classified, and analyzed. Instances of increase or decrease are particularly studied to ascertain the causes of such movements with a view to suggesting means for further stimulating the trade or for removing obstacles that retard its natural growth. In cases of special importance, where printed returns and correspondence prove inadequate, a representative of the office is sent to obtain by personal investigation the information needed.

The many inquiries received regarding our foreign trade necessitate a large correspondence, which, however, has been greatly facilitated by the policy of incorporating in printed reports the information of most general interest.

Of the reports of the office, four are now issued as regular annual series. The first gives the value and, wherever practicable, the quantity of the various agricultural products imported into and exported from the United States during the last two years, but without detail as to countries of source or destination. That publication is followed by three fuller reports, one showing the various sources of each agricultural import, another the distribution of each agricultural export, and the last relating to the trade with the noncontiguous possessions of the United States, each covering a period of three years. Summary tables in these reports give the total agricultural imports and the total agricultural exports of the United States with the several foreign countries and with our insular dependencies. The three bulletins together constitute a complete statistical exhibit of the agricultural import and export trade of this country.

Work has recently been begun on a new series of reports covering in the fullest possible manner the agricultural import trade of each of the leading European countries. As a means of indicating the lines of trade that afford the most promising opportunities for development, detailed statistics are given as to the proportion of the various imports contributed by the United States and by its commercial rivals.

From time to time special studies are made of particular agricultural products for the sale of which there is keen and complicated international competition. Attention is devoted to the facilities for transporting agricultural products from this country, the various lines of steamships, ocean freight rates, and facilities for refrigerating. Among other subjects within the scope of the work of this Division are the prices of agricultural products, domestic and imported, in prominent foreign countries, and a study of successful export trade in certain agricultural products of other countries. This Division possesses a very large subject index of references to articles in an immense number of current publications, domestic and foreign. These articles are of every imaginable sort and bear exclusively upon the exportation of agricultural products, actual and potential.

#### LIBRARY.

*Librarian*, JOSEPHINE A. CLARK; *Assistant Librarian*, CLARIBEL R. BARNETT.

The Librarian purchases books and periodicals, supervises their arrangement and cataloguing, and has charge of the preparation of bibliographies and similar publications. The Librarian is also in charge of the mailing lists for the distribution of Department publications in foreign countries.



## OFFICE OF EXPERIMENT STATIONS.

*Director, A. C. TRUE; Assistant Director, E. W. ALLEN; Chief Clerk, Mrs. C. E. JOHNSTON.*

The work of the Office of Experiment Stations includes: (1) Relations with American and foreign institutions for agricultural research, together with the supervision of expenditures of the agricultural experiment stations in the United States; (2) the preparation of publications mainly based on those of the experiment stations; (3) the management of the experiment stations in Alaska, Hawaii, and Porto Rico; (4) relations with agricultural colleges and schools, farmers' institutes and kindred organizations at home and abroad, and the general promotion of agricultural education in the United States; (5) investigations on the nutritive value and economy of human foods, and (6) irrigation and drainage investigations. The last two lines of work (5 and 6) involve cooperation with the agricultural colleges and experiment stations.

## RELATIONS WITH INSTITUTIONS FOR AGRICULTURAL RESEARCH.

*E. W. ALLEN, Assistant Director and Editor of Experiment Station Record; W. H. BEAL, Editor of Experiment Station Work.*

This office represents the Department in its relations with the agricultural experiment stations maintained in all the States and Territories under the acts of Congress of March 2, 1887, and March 16, 1906. It supervises the expenditures of the Federal funds granted to the stations under these acts and publishes information regarding their organization, equipment, resources, and work. Its principal publications based on the work of the stations are in two series, (1) Experiment Station Record, and (2) Experiment Station Work.

The Experiment Station Record, begun in 1889, comprises abstracts of the bulletins and annual reports of the experiment stations in the United States, the publications of the United States Department of Agriculture, books, journals, and miscellaneous publications containing reports of investigations in agricultural science in the different countries of the world; special articles by American and foreign experts in agricultural science; editorials on important matters regarding the progress of agricultural education and science; suggestions of lines of inquiry for our stations; and notes on the organization, equipment, and development of institutions for agricultural education and research at home and abroad. Each volume of the Record consists of twelve numbers, the last of which contains detailed author and subject indexes. This journal is sent without charge to institutions for agricultural education and research in this country and the officers of such institutions, to similar institutions in foreign countries, important libraries, and to a select list of scientists and specialists who cooperate with the Department by furnishing information, exchanging publications, or otherwise. It is also sold by the Superintendent of Documents at \$1 a volume.

Experiment Station Work, which is published periodically (every two months) in the Farmers' Bulletin series of the Department, gives a popular summary of some of the more salient practical results of the work of the experiment stations, and is distributed free of charge.

The editorial staff engaged in the preparation of these periodicals is as follows: Meteorology, Soils, and Fertilizers, W. H. Beal; Agricultural Botany and Vegetable Pathology, W. H. Evans, Ph. D.; Field Crops, J. I. Schulte; Horticulture and Forestry, C. B. Smith; Zootechny and Human Nutrition, C. F. Langworthy, Ph. D.; Agrotechny, Dairy Farming, and Dairying, H. W. Lawson; Agricultural Chemistry, W. H. Beal, C. F. Langworthy, and H. W. Lawson; Economic Zoology, Entomology, and Veterinary Medicine, E. V. Wilcox, Ph. D.; Rural Engineering, B. P. Fleming; Rural Economics, J. B. Morman; Agricultural Education, D. J. Crosby.

## EDITORIAL DIVISION.

W. H. BEAL, *Chief.*

The bulletins and miscellaneous publications of the Office may be classified as follows: (1) Technical bulletins; (2) farmers' bulletins, including the sub-series entitled "Experiment Station Work;" (3) card index of experiment



station literature; (4) circulars; (5) monthly list of station publications, and (6) miscellaneous publications, comprising schedules, articles published as separate, and charts.

In the preparation and editing of the bulletins and miscellaneous publications of the Office the chief of the editorial division is assisted by the staff of the Experiment Station Record.

#### DIVISION OF INSULAR EXPERIMENT STATIONS.

WALTER H. EVANS, *Chief.*

This Division is charged with the general business connected with the management of experiment stations in Alaska, Hawaii, and Porto Rico.

#### ALASKA AGRICULTURAL EXPERIMENT STATIONS.

C. C. GEORGESON, *Sitka, Special Agent in Charge.*

The agricultural investigations in Alaska are conducted under the direction of this office. The main station is located at Sitka. Investigations are also carried on at Kenai, on Cook Inlet; at Copper Center, in the valley of the Copper River; and at Rampart, in the Yukon Valley. The work consists of field experiments with vegetables, cereals, and forage plants, horticultural investigations, the maintenance of live stock, the curing of hay and silage, the distribution of seeds, and an agricultural survey of the Territory. Besides the special agent in charge, the officers of the stations are as follows: R. W. De Armond, assistant, at Sitka; P. H. Ross, assistant, at Kenai; J. W. Neal, assistant, at Copper Center; F. E. Rader, assistant, at Rampart.

#### HAWAII AGRICULTURAL EXPERIMENT STATION.

JARED G. SMITH, *Honolulu, Special Agent in Charge.*

The Hawaii Agricultural Experiment Station has been established under the direction of this office, with headquarters at Honolulu, where a tract of land has been reserved for its use by the Hawaiian Government. The investigations include experiments with coffee, tobacco, rice, forage crops, fiber and horticultural plants, and investigations in vegetable pathology and in entomology. Besides the special agent in charge, the officers of the station are as follows: D. L. Van Dine, entomologist; J. E. Higgins, expert in horticulture; F. G. Krauss, rice expert, and ————, chemist.

#### PORTO RICO AGRICULTURAL EXPERIMENT STATION.

D. W. MAY, *Special Agent in Charge.*

The Porto Rico Agricultural Experiment Station has its headquarters at Mayaguez, on a tract of land of 235 acres purchased for its use by the insular government. Investigations are in progress on questions relating especially to the growing of coffee, field crops, and horticultural plants, the development of animal industry and dairying, soils, vegetable pathology, and entomology. The officers of the station are: The special agent in charge; J. W. Leenhoff, coffee expert; H. C. Henriksen, assistant in horticulture; W. V. Tower, entomologist and plant pathologist; and E. F. Curt, farm superintendent.

#### RELATIONS WITH AGRICULTURAL COLLEGES AND SCHOOLS.

D. J. CROSBY, *Expert in Agricultural Education.*

This office represents the Department in its relations with the agricultural colleges established under the acts of Congress of July 2, 1862, and August 30, 1890. It collates and publishes information regarding the organization, equipment, resources, and courses of study of agricultural colleges and schools in this and other countries. It promotes the general interests of agricultural education throughout the United States, including especially the introduction of instruction in agriculture into secondary and elementary schools.

## RELATIONS WITH FARMERS' INSTITUTES.

JOHN HAMILTON, *Farmers' Institute Specialist.*

This office investigates and reports upon the organization and progress of farmers' institutes in the several States and Territories, and aids in making such organizations more effective for the dissemination of the results of the work of the Department of Agriculture and the agricultural experiment stations, and of improved methods of agricultural practice. It also aids in the wider diffusion of agricultural education among adults through movable schools, correspondence courses, and other forms of so-called extension work.

## NUTRITION INVESTIGATIONS.

C. F. LANGWORTHY, *Chief.*

The investigations on the food and nutrition of man in charge of this Division of the Office include: (1) Dietary studies; (2) digestion experiments; (3) cooking experiments; and (4) metabolism experiments. Investigations are carried on largely in cooperation with the agricultural colleges and experiment stations in different parts of the country.

Metabolism experiments with the respiration calorimeter, digestion experiments, and studies of general experimental methods are carried on at Wesleyan University, Middletown, Conn., by F. G. Benedict, physiological chemist; dietary studies and digestion experiments are conducted at the University of Maine, Orono, Me., by C. D. Woods, and at the University of Tennessee, Knoxville, Tenn., by C. E. Wait; metabolism experiments by H. C. Sherman, of Columbia University, New York, N. Y.; investigations on the culinary qualities of corn meal by Helen Kinne, Teachers' College, New York; investigations on meats at the University of Illinois, Urbana, Ill., by H. S. Grindley; on cereals at the University of Minnesota, Minneapolis, Minn., by Harry Snyder; on fruits and nuts at the University of California, Berkeley, Cal., by M. E. Jaffa.

## IRRIGATION AND DRAINAGE INVESTIGATIONS.

ELWOOD MEAD, *Chief.*

The Irrigation Investigations branch of this Office aims to extend the area irrigated and the yield and value of crops grown on these areas by improving irrigation practice in the distribution and use of water. It includes: (1) Field investigations of the methods of preparing land for irrigation, methods of conserving moisture by skillful application and cultivation, and methods of obviating or removing the injuries effected by waste and seepage waters; (2) the development of methods for utilizing ground and storm waters in irrigation and the extension of irrigation in the semiarid region through the use of limited water supplies; (3) studies of the legal and economic relations of irrigators to each other and to the public. This includes the relation of the Government to individuals and communities in the appropriation of water and the relation of individuals to each other in methods of organization for the distribution of water from streams, ditches, and canals.

The Drainage Investigations include: (1) The making of surveys and investigations to determine the best means of reclaiming the swamped and overflowed lands of the East, the improving of all agricultural lands which require drainage, and also investigations and the preparation of plans for the removal of seepage waters in irrigated districts and the reclamation of lands injured by excess of water and alkali; (2) studies of the legal and social questions connected with the organization of communities or districts for the drainage of areas too large to be handled by corporate or individual enterprise, and where these improvements give rise to complicated questions connected with methods of assessment and management.

The investigations of the application of power to agricultural purposes include studies of pumping in irrigation and drainage and the collection of information and making of original investigations which will give farmers definite information about the value and best methods of using forces such as wind, gas, electricity, and steam to supplement the work of men and animals on the farm.

In addition to these three lines of investigation, work is being done in the collection and collation of information about the use of different kinds of material in farm structures, including studies of cement and concrete in structures for the conveyance and distribution of water for irrigation, household, and stock purposes; studies of ventilation of buildings and the use of new kinds of material in the construction of farm buildings.

In addition to independent investigations and experimental work being carried on in different parts of the country by this office, much work is being done in cooperation with States under special State appropriations, and with a number of agricultural colleges and experiment stations.

C. G. Elliott, drainage engineer, is in charge of drainage investigations; R. P. Teele, expert in irrigation institutions; Samuel Fortier, engineer, in charge of the Pacific District, Berkeley, Cal., and F. W. Roeding, expert, in charge of irrigation extension.

#### OFFICE OF PUBLIC ROADS.

*Director*, LOGAN WALLER PAGE; *Assistant Director*, ALLERTON S. CUSHMAN; *Highway Engineer*, V. M. PEIRCE; *Chief of Records*, MAURICE O. ELDRIDGE; *Chief Clerk*, J. E. PENNYBACKER, Jr.

The office of Public Roads collects statistics concerning systems of road management and all phases of road improvement and makes a comparative study of the subject; investigates methods of road building, and furnishes expert assistance to rural sections in road construction; tests road materials and ascertains their location and comparative value; cooperates with schools and colleges in highway engineering instruction, and publishes information of value concerning road improvement for free distribution.

The work of the office is mainly directed: (1) To the collection and compilation of data in reference to systems of road management and to a comparative study of such systems in order to determine the merits and defects of each as far as possible and to ascertain the causes of success or failure. (2) To obtaining full and accurate statistics on all phases of road improvement and presenting them to the public in such form as to constitute a practical basis for the determination of many points bearing upon the economics of road construction. (3) To directing the efforts of rural sections along proper lines in actual road building; and to this end highway engineers, road experts, and road machinery experts are detailed to render advice and cooperate with local officials in the construction of short sections of model roads, which frequently form nuclei of extensive systems of improved roads. (4) To ascertaining the location, availability, and comparative value of road-building materials in all parts of the United States, for which purpose laboratories are maintained in Washington to investigate the chemical and physical properties of road materials and other materials of construction, and to conduct experiments tending to increase facilities for road improvement so far as materials are concerned. (5) To finding practical solutions for the problems confronting large sections of country where, from lack of natural road materials or from other causes, the cost of hard roads is now prohibitive. Experimental roads are built to test substitutes for natural road materials, and the question of long-distance transportation receives careful consideration. (6) To directing more general attention to highway engineering in schools and colleges throughout the United States, in order that an adequate number of competent highway engineers may be prepared to carry on properly the vast work of highway improvement. The office is endeavoring to keep in close touch with educational institutions in this respect and to render every assistance possible. In furtherance of this general plan a one-year post-graduate course in highway engineering is conducted by the office, providing practical laboratory and field instruction and experience. The advantages of this system are mutual—the student renders service to the Government and in turn receives a small money compensation and such training as will fit him to discharge intelligently the duties of his profession. (7) To cooperate with agricultural colleges and experiment stations wherever practicable in order to accomplish the purposes above outlined. In all States having State highway officials the office acts in harmony with such officials. (8) To disseminate by all available means information of value to the American people in connection with the improvement of roads.

